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USSR Report

CONSTRUCTION AND EQUIPMENT

No. 30



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CONSTRUCTION

CHAIRMAN OF USSR GOSSTROY DISCUSSES WAYS OF IMPROVING CAPITAL CONSTRUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Feb 81 p 2

[Interview with I. T. Novikov, deputy chairman of the USSR Council of Ministers and chairman of USSR Gosstroy: "Potentials for Accelerating"]

[Text] [Question] At the October (1980) Plenum of the CPSU Central Committee comrade L. I. Brezhnev named capital construction as being among the courses of economic activity in the country that deserve the most serious attention during the upcoming five-year plan. The sector's problems have been clearly formulated in the draft of the Main Directions. The essence of the matter is to find reliable ways of solving these problems during the new five-year plan, starting right with the 1981 plan.

We ask you to speak about these ways of improving capital construction which have been contemplated and are being contemplated by USSR Gosstroy, Ignatiy Trofimovich.

[Answer] Capital construction is given constant and steady attention in our country by the CPSU Central Committee, the Soviet government, and by comrade L. I. Brezhnev personally. And this is not by accident. For every year more than one-fifth of the national income is allocated to our sector.

In the CPSU Central Committee's draft of the "Main Directions for Economic and Social Development in the USSR for 1981-1985 and for the period to 1990" for the 26th party congress, the tasks that were presented to the sector as being the most important ones are to increase the efficiency of capital construction, to further raise the country's production potential and to develop the non-production sphere on a new technological base. It is these very problems to which USSR Gosstroy is devoting the most attention in its activities.

During the current five-year plan the approach toward solving many of the problems of utilizing the achievements of science, technology and advanced know-how in construction is being changed in a fundamental manner so that all that is new is incorporated into the standards and designs and so that it is extensively used at construction sites. USSR Gosstroy is bringing about on an extensive scale the transition of scientific research, structural design and production organizations to plan work based on the creation and introduction of new technology and the adoption of the new unified programming method technology. A large portion of the sector's scientific and technological potential will be directed toward solving the most important general state, territorial and sector problems of the construction complex.

We expect a tangible return from this work: the completion of the overall special purpose scientific and technological program will make it possible to economize more than 1 million tons of metal and 1.8 million tons of cement and to free (conditionally) almost 380,000 people in construction in 1985 as compared with 1980. Along with this the quality of construction will improve and its duration will be reduced. The annual economic effect on the volume that is introduced in 1985 will exceed the analogous index for the previous five-year plan by a factor of 1.5 to 2.

The plan for developing and introducing new technology should be organically related to the indices in the plan for construction and installation organizations and for enterprises in the construction industry. The complete utilization of significant potentials which make it possible to realize new design and structural approaches must be achieved. And we have such reserves. For instance, existing capacities for producing prefabricated reinforced concrete and metal components are not being completely utilized to a considerable extent in the country. Construction ministries are still not strongly providing an increase in production volumes or using efficient structural parts and components. The proportion of structural components from prestressed reinforced concrete and high strength concrete has practically not increased during recent years.

It is very important to increase the responsibility of the ministries, departments, scientific research and design institutes, construction organizations and industrial enterprises in all of this work.

Another effect of capital construction efficiency is a further perfection of design and estimate matters, an improvement in quality, and the technological level and economical nature of the enterprises and structures that are designed. The results of an examination of the designs and technical and economic foundations, which was conducted by USSR Gosstroy, testify to the fact that the latest achievements of science and technology in the area of production technology and overall planning and structural approaches for buildings and structures are not being used in many of them. The necessary attention is not being given everywhere to the economic use of labor, material and natural resources, to increasing the level of industrialization, and mechanization and to improving the organization of construction.

Proposals which specify overall measures to further perfect design and estimate matters and to improve the quality of design have been worked out by USSR Gosstroy with participation by USSR Gosplan, the ministries and departments on the basis of a careful analysis of the state of affairs in design work. The practical realization of these measures will become an important direction of the work of USSR Gosstroy, the ministries and departments during the forthcoming five years. As before, constant attention will be given to standardizing buildings and structures, to extensively adopting typical designs, assemblies and components, to developing the design and construction of industrial enterprises as part of industrial centers and to more closely link housing construction with solving the problems of developing capacities that are put into operation.

A significant effect should be obtained in capital construction by means of improving the organization and technology of construction, by extensively utilizing the latest

expertise, and the central method of designing, preparing, organizing and managing construction. Much work is being done in this direction at the present time by USSR Gosstroy in conjunction with the corresponding ministries and departments.

And, finally, the effectiveness of capital construction will depend, to a considerable degree, on how the measures in the 11th Five-Year Plan for improving the economic mechanism that were specified in the July (1979) decree by the CPSU Central Committee and USSR Council of Ministers are realized.

[Question] How does USSR Gosstroy evaluate the preparatory work which is being done by contract ministries to transfer to planning according to finished construction production?

[Answer] Planning and evaluating the activities of contract organizations based on construction commodity production is a significant step forward. A certain amount of knowledge about planning and calculating according to such an index has already accumulated in the sector. In the organizations where this was done during the course of an experiment the goals for putting enterprises and structures into operation were better fulfilled, the average duration of construction was reduced, the number of structures that are simultaneously under construction was lowered and the volume of incompleting work was reduced.

In 1981 the volume of construction commodity production for the ministries and departments is set at more than 67 million rubles and it should be completely met. It is necessary for clients and contractors, while keeping this volume in mind, to once again carefully review design and estimate documents for starting structures in 1981 and 1982, to isolate the starting complexes that are among them and also to define the volume of construction commodity production more accurately that is in the capital investment plans for the current year. It is very important for USSR Gosplan, USSR Gosstroi, the ministries and departments to take additional measures to eliminate the lack of coordination of the work plans with the delivery of equipment by assigning material and technological resources to those job sites where more are needed.

[Question] Ignat'y Trofimovich, at the beginning of the last five-year plan, when answering "SOTSIALISTICHESKAYA INDUSTRIYA'S" questions, you spoke of measures for improving the reliability of estimates and for speeding up the preparations for design and estimate documents. How are these matters faring today?

[Answer] It should be noted that the measures which were taken by USSR Gosstroy, the ministries and departments during the 10th Five-Year Plan for improving the reliability of estimates and for speeding up design time have brought certain positive results. An excessive approval in the number of designs was noticeably reduced: 448 during the four years of the last five-year plan as opposed to 849 for the same period of the Ninth Five-Year Plan. This excessive approval continued basically for designs that were prepared before the instructions for developing designs and estimates for industrial construction were adopted. Of the total sum of 7.3 billion rubles--the estimated cost of construction has grown that much--almost 60 percent is going toward increasing expenditures that will have a positive effect on the national economy as the result of the central state policies in

economic, social, technical and other spheres. The remaining portion of the above sum is the result of increases in the costs for equipment, construction which exceeds the standard length of time, overextension of funds by the ministries and departments for the numerous construction sites and errors and miscalculations by design and scientific research organizations.

The procedure for working out designs and estimates which was established by USSR Gosstroy has made it possible to reduce design time by approximately one year and to correspondingly hasten the starting time for construction of new structures. This was achieved by means of simultaneously preparing the technical and working design and the working drawings into a single stage.

However, one cannot say that everything that is possible was done in this direction. As before, technological and structural decisions for the enterprises and structures that are being designed which have not been sufficiently worked out in depth still exist, the requirements of the enterprises which are under construction are not always taken into consideration for the long term as completely as possible everywhere, and other flaws are encountered.

Proposals to further improve design and estimate matters, as I have already said, have been prepared by USSR Gosstroy. They will already be realized starting with 1981. The transition to new estimated standards and prices in construction, which will be accomplished starting with 1 Jan 1984, will be effective in increasing the reliability of estimates in a positive way.

[Question] "During the eighties the transition of the economy onto a new track of intensive growth must be accomplished, labor productivity and quality must be sharply increased"—Leonid Il'ich Brezhnev placed such a task before all of the sectors of the national economy. What can be said about this with respect to capital construction? What ways are seen of solving this very complex and important problem?

[Answer] As is well known from the draft of the Main Directions labor productivity must increase by 15 to 17 percent in construction. This goal is lower than for the last five-year plan. However, it should be kept in mind that each percentage point of growth in labor productivity has become more difficult. Where 20 years ago an increase of 311 million rubles in the volume of construction and installation work provided one percentage point of growth in labor productivity, now the same percentage point is worth 703 million rubles in the volume of work.

A further increase in the level of industrialization and the degree of factory preparedness of construction parts and components will become the principal source of growth in labor productivity during the 11th Five-Year Plan. The labor of approximately 400,000 people will be saved by means of this factor during the five-year period and output will increase by 5 to 6 percent.

A reduction in manual labor has great potential in the sector. At the present time a large number of construction workers do their work by hand, including more than 70 percent of the workers who do plastering, painting, carpentry and joiner's work. In this regard the timely realization of the measures which have been adopted by the

government for expanding production and improving the quality of mechanized and hand tools, machines for finish work and other small scale means of mechanization is very important.

We place much significance on further spreading such advanced forms of organizing labor as the brigade contract method, the Orlov system of uninterrupted construction planning, the initiatives of Rostov workers—"We will build ahead of schedule and develop capacities ahead of schedule"—and others.

The formation of stable work collectives and the improvement of working conditions at construction sites should become the subject of special concern for the ministries and departments as well as for construction organizations.

[Question] A few words about reconstruction. It is not necessary to argue that, in the majority of cases, it is more efficient than new construction. But the time period for reconstructing enterprises is extending to many years. Yet the activities of contract organizations will already be evaluated by the structures which are put into operation during the first year of the 11th Five-Year Plan. And what results is that it is again not advantageous for construction workers to be engaged in reconstructing enterprises.

[Answer] That's not quite the way it is. The necessary conditions for ensuring that contractors as well as clients have the incentive to complete reconstruction work for enterprises have been specified by the CPSU Central Committee and USSR Council of Ministers' decree concerning an improvement in the economic mechanism. In particular administrators of associations have been given the right to approve the title lists for technological re-equipment within the limits of the capital investments irrespective of the total estimated cost of the work and also to use the sector's correction coefficients against the estimated rates of overhead expenses for the technological re-equipment and reconstruction work. Bonuses have been introduced for completing technological re-equipment work for operating enterprises for construction and design organizations as well as for the clients' enterprises.

Thus, economic incentive for enterprises and organizations to carry out technological re-equipment and reconstruction work on an extensive scale has been provided to a sufficient degree. The task now is for the ministries and departments to apportion capital investments first of all toward reconstruction and technological re-equipment and to actively begin the task of completing such work as the most effective way of technologically improving the sector.

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CSO: 1821

CONSTRUCTION

TRUST DIRECTORS DISCUSS NEW CONSTRUCTION MANAGEMENT SYSTEM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Jan 81 p 2

[Discussion between I. Bydantsev and V. Kostyrya, directors of trusts: "The Construction Site in the System of New Indices; We are Discussing the Draft of the Main Directions"]

[Text] An exceptionally large amount of attention is given to the problems and goals of capital construction in the draft of the Main Directions. Everything that is related to improving capital construction is acquiring so much importance today that during the current year the massive transition to a new system of capital construction planning is beginning which was specified by the famous CPSU Central Committee and USSR Council of Ministers' decree concerning an improvement in the economic mechanism.

How do builders and installers themselves evaluate their own and their partners preparedness for operating under the new conditions? Two directors of trusts are having a discussion about this--Igor' Vasil'yevich Bydantsev ("Uralsmashstroy") and Vasilii Kirillovich Kostyrya ("Uralsmetallurgmontazh").

I. Bydantsev: -- The experience of Belorussian construction workers over a period of five years has convincingly shown that even with all of the imperfections of an experimental implementation the transition to planning by construction commodity production makes it possible to solve two basic problems--that of accelerating the start up of new capacities, and along with this, of reducing the volumes of incomplete construction production, i.e. of solving just those problems which are particularly emphasized in the draft of the "Main Directions."

Now, guided by the experience of the Belorussians, all contract organizations in the country must transfer to the new system of indices. Are we prepared for this? If you are speaking about our trust or about our main administration the answer is yes. For a year and a half, since the moment the decree was published, much has been done. For instance, we have strengthened our service of engineering preparations for construction, and we have redirected the trust's ASU [expansion unknown] construction complex to plan according to construction commodity production. Since February of last year we have organized intensive methodological training at all levels of management including crew foreman of the largest composite crews as well, and we have carefully studied both the decree itself as well as the methodological materials which the main administration has available. We made an experimental re-evaluation

of one of our subdivisions--SU-23 [Construction Administration-23]--by taking into consideration the new requirements and obtained something similar to a standard which, by its nature, is a training ground on which we developed the practice of planning according to commodity production. It was no coincidence that we selected SU-23; it was the repeated winner of competition between USSR Ministry of Heavy Industry Enterprises' collectives.

V. Kostyrya: -- We also have made such preparations--by considering the specific nature of the assembly trust. But this is just theory. Practice still remains. The session of the USSR Supreme Soviet long ago approved the state plan for the current year but there is a lack of clarity for many of the construction sites. Documents, as before, are late although their submittal time has now been moved from September to June and delivery times for equipment are not established. And yet commodity production is already the basis of the plan for 1981, i.e. the start up of capacities and not developing the volumes to be produced!

I. Bydantsev: -- Indeed the impression is forming that clients, not all, certainly, but many--are simply not ready to transfer to the new system of planning and calculations in capital construction. For example, in "Uralmashstroy" at the end of November about one-third of the projects for the year have not been provided with technical documents. Even "Uralmash" did not submit them entirely complete! If clients conduct such policies in the future as well builders risk ending up on financial shoals. Therefore, I think that a position concerning the strict observance of the schedules for turning over technical documents and delivering materials and equipment, which have been established by directive or stipulated by an agreement, should be included in the text of the "Main Directions."

Nevertheless, financial shoals also threaten us at times in the case where everything is done which is required of us. We tried to "test" the new system of planning and calculations in modern practice--and the picture one gets makes one be on the look out. I am not speaking now about the fact that the start up for a majority of structures occurs at the end of the year--that is bad and disrupts rhythm. But, let's say we have managed to do our work. As to whether our account will be settled, that is still the question. Here is a specific case. We turned over the capacities at the Sverdlovsk plastics factory during the first half of the year. The workers' commission signed the formal document. Everything! Our task was completed. But we have the legal right to receive money from the client only after the state commission's formal document is approved, i.e. after the first product is obtained. And the client has no raw materials.... And now instead of speeding up the time for the start up of operations, which the collective attempted to do, we obtained the unnecessary baggage of unfinished production. And we pay the bank a higher percentage for credit.

V. Kostyrya: -- The example is quite typical. The same thing happened to us with the "Elektrokhimprom" sulfuric acid production association in Chirchik. We completed the installation of equipment there in 1979 in complete accordance with the design. And the plant turned out products only in August of last year but the client has still not settled with us even today. Thus, we turned out to be guilty without any guilt; we lost all of the advantages of putting capacities into operation on time or ahead of schedule.

Here is how I see a way out of the situation. Either the condition for obtaining a product from the capacities which have been turned over must be excluded from the concept of construction commodity production and we and builders be required to accurately complete the design or impose on the contractor, i.e. us assemblers, the obligation of both adjusting the equipment and obtaining the first product. In order to somehow insure against disruptions we would simply be forced to form an installation and adjustment administration in the trust and when we see a client's obvious lack of preparation we would set about adjusting things ourselves. Certainly this is not the best alternative.

I. Bydantsev: -- The crux of the matter, clearly, is the unequal responsibility for the final result--the start up of operations.

The responsibility of contract organizations, in my opinion, has been outlined with sufficient precision today: in the event of a disruption in the start-up schedule we bear heavy material losses--payment for bank credit rises sharply and funds for material incentive and growth are reduced. And what about the client or the design institute? Under the same circumstances they bear practically no material losses. Theoretically, we have the right not to allow structures which have not been provided with documents on time, to be a part of the plan. But only theoretically. The stable five-year plan has been laid as the foundation of the new management mechanism for capital construction. But this stability must be preserved at all levels and for all revisions. And, that means, the responsibility--both materially and administratively--must be equal at each stage and for each participant in the formation of this or that capacity.

V. Kostyrya: -- I think that, in addition to responsibility, incentive is also needed. At the present it exists to the full extent again only for contractors. For the client and designer a bonus for starting up operations on time or ahead of time is nothing more than a pleasant supplement to the primary bonus fund which is formed by means of their own private production activity. And it appears that it is precisely the start up of capacities that should prove first of all to have the most significant effect on the amount of the incentive funds that our partners have. To legalize this relation means to make it harder to obtain permission to disrupt the projects in the approved state plan for putting capacities into operation and to increase the incentive to observe all of the conditions of the contract agreement.

Here is something, in my opinion, that workers at the Union Gosplans, Gosstroy and the Construction Bank can give some thought to.

I. Bydantsev: -- There is still one important problem. Since 1 January of the current year correction coefficients for estimated standards and for the standards for overhead expenses for reimbursing contract organizations for the additional expenses related to the specific nature of reconstruction were adopted by a USSR Gosstroy decree. Together with specialists from "Uralmash" we calculated the expenses that will be forthcoming during the new year, originating with the specific work conditions at structures under reconstruction. And no matter how we split hairs we always obtained the result that our sector coefficient does not reflect realistic expenditures. This means that this monetary supplement which we receive does not compensate for expenditures. Our colleagues from Pervoural'sk--their business is with metallurgical production--informed us that the gap that they obtain is even greater: almost by a factor of 3.

Why not make a type of "prong" in these coefficients and give the contractor the right to correct the coefficient in conjunction with the client and design organization in its revisions? The client is not interested in overpaying and will advocate the smallest possible cost. But he is interested in reconstruction itself; it is advantageous for him even under conditions of fully reimbursing the contract organization for expenses and providing it with the standard profit. Reconstruction, even in this case, is cheaper than new construction.

The system of credit must also be more versatile. Today, irrespective of the specific reason for the disruption in the planned time for turning over a structure for use, the material responsibility for this is placed only upon the contractor by the Regulations on Contract Agreements. Apparently, the necessity of introducing changes in these regulations and specifying the client's responsibility in them has become urgent. If the start up did not take place due to his fault then let the client also take upon himself the expenses for the loan that is past due.

V. Kostyrva: -- Here I would like to add this. The Construction Bank is a participant in capital construction which has equal rights and responsibility. This means that it must not only actively use its control rights over its relationship with contractors but also bear the responsibility for its actions. Dozens of examples may be given where bank workers have placed us in an extremely difficult position. Let's say we have confirmed that a client has documents for five million rubles' worth of construction and installation work while not paying attention to the fact that the documents are incomplete. And in the meantime we have scraped together two to three million with difficulty, which could have been put to use, originating with the production technology for the work. It seems to me that the bank should either carefully study the documents itself or entrust this to the contractor and base its decision on his opinion.

I. Bydantsev: -- So that everyone answers for himself. I have one more proposal in this plan. In my opinion, the obvious necessity of some kind of organizational regulation has become urgent. For example, designate the leading installation organization as the head subcontractor so that this organization takes upon itself the function of coordinating installation and special work.

V. Kostyrva: -- Well, the idea is a good one. In essence such an organization of affairs could not have better corresponded to one of the most important positions that was expressed at the October (1980) Plenum of the CPSU Central Committee. "For the normal functioning of the economy," said Leonid Il'ich Brezhnev, "the initiative of the local areas, the labor collectives and the economic administrators must be developed in every way possible. It is necessary that the main mass of operative problems be solved precisely there where they can be solved quickly without unnecessary delay and approval." And it is natural that this idea be reflected in the draft of the Main Directions. We really need a more versatile system of management by which administrators locally take upon themselves complete responsibility for solving operative problems.

I. Bydantsev: -- And all of this must be done, not putting it off, so that, again, as emphasized at the Plenum we "do not drag along outmoded structures in the new five-year plan."

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CEO: 1871

CONSTRUCTION

BELOARUSSIA'S PROGRAM 19 DEVELOPS IMPROVED CONSTRUCTIONAL STRUCTURE

Minsk SOVETSKAYA BELORUSSIYA in Russian 17 Jan 61 p 2

[Article by V. Lastochkin, deputy chairman of Belorussian SSR Gosstroy: "Program 19: Results, Prospects and Problems"]

[Text] For 5 years SOVETSKAYA BELORUSSIYA has been acting as patron to fulfillment of the so-called scientific and technical Program 19. It calls for the development and introduction of effective constructional structure that is based upon high-strength and lightweight concretes, polymer concretes, plastics and other materials and of mechanized industrial lines for producing them, which will provide for a 20-25 percent reduction of materials intensiveness and a 1.5-fold to 2-fold increase in labor productivity. The newspaper has dedicated a number of items to this problem, and today it publishes the concluding article, in which the main results of the work are cited.

The goals of Program 19, which were realized during the 10th Five-Year Plan by many of the republic's scientific-research, design and construction organizations, conformed to the main trends of scientific and technical progress in housing, public-building, industrial and agricultural construction. These were, primarily, the creation of lightweight enclosure structure, effective structure made of high-strength concretes and glued wood, and structure with high operational stability in aggressive environments, and mechanized and automated industrial processes for producing them, together with substantial improvement in the sanitation and hygiene of the working conditions. In all cases the main specific goals were: reduction of materials intensiveness by 20-25 percent and a 1.5-fold to 2-fold increase in labor productivity.

In evaluating the results of the work of both the Institute of Construction and Architecture of BSSR [Belorussian SSR] Gosstroy--executive agent for all specific tasks of the problem--and the many design and construction organizations of the republic, it can be stated that the main scientific and technical developments contemplated have been brought to their logical conclusion and that in most cases they have won industrial-test approval. As a rule, the constructional structure and industrial processes that were developed were original in nature and are protected by invention patents. In all, 18 patents were obtained for these developments.

The greatest effect was achieved for those program tasks for which the research, scientific and technical developments, and industrial testing were conducted in integrated fashion, with specific orientation and in creative collaboration of all the elements of scientific and technical progress--scientists, developers, manufacturing engineers, designers, and engineers and technicians of industry and construction.

The set of operations to create lightweight enclosure structure can be an example of this fruitful collaboration. As a result of integration of the creative efforts of the Institute of Construction and Architecture, Belpromproyekt (Belorussian Institute for Industrial Design), BelNIIfgiprosoel'stroi (Belorussian State Scientific-Research and Design Institute for Agricultural Construction), Belkolkhozproyekt (Belorussian Institute for Kolkhoz Design), the former Orgtekhtroiy (State Trust for Industrialized Construction), the Prommontazh association and a number of construction organizations of BSSR Minpromstroiy (Ministry of Industrial Construction), BSSR Minmel'stroiy (Ministry of Rural Construction) and Belmeshkolkhozstroiy (Belorussian Trust for Interkolkhoz Construction), it was possible to create and introduce widely a set of original structure for walls and roofs of industrial and agricultural buildings. This structure was 3-4 times as light as the traditional structure, metal consumption was reduced 2.5-fold, and labor intensiveness of manufacture was reduced 1.6-fold. Even with limited amounts of introduction, the economic benefit of its use during the 10th Five-Year Plan was about 2 million rubles.

An example no less typical of successful creative collaboration of collectives of various types were the operations aimed at creating structure and technology for manufacturing reinforced-concrete load-bearing members of ring cross-section (active participants were BSSR Minpromstroiy, Belorussian Polytechnical Institute, Belpromproyekt and other organizations). The originators of the development successfully used the advantages of ring-configured load-bearing members and the centrifugal method of molding reinforced-concrete products. This enabled consumption of concrete and steel to be reduced by 50 and 25 percent, respectively. Productivity during the manufacture of columns rose 20 percent, and the sanitation and hygiene of the working conditions were greatly improved. Work on the topic was not limited to the creation of a test run of structure and experimental checking thereof in individual tasks. The industrial production of such structure was organized in the BSSR Minpromstroiy system in a relatively brief period, and more than 20 production and nonindustrial buildings were built.

It would seem that the experience in organizing the research and in introducing the ring-type structure should be carefully studied and used widely during planning and in carrying out scientific-technical and specific integrated programs of the 11th Five-Year Plan.

A no-less important feature in carrying out various Program 10 tasks was the trend that has been noticed of attracting machinebuilding enterprises to participate in major scientific and technical developments. This corresponded completely to the instructions that CPSU Central Committee General Secretary L. I. Brezhnev expressed at the October 1980 CPSU Central Committee Plenum. We have often felt that only the participation of machinebuilding enterprises can provide high quality in the new machinery that is being created, the required operating reliability of the industrial equipment, a high degree of mechanization of the production processes, and improvement in working conditions.

Automated lines for vibrationfree molding of exterior wall panels and pavement that were created in accordance with Program 19 tasks (later the introductions were broken down into a separate program) can be convincing confirmation of this. The first of these was created at Plant No 1 for Large-Panel Housing Construction by the Institute of Construction and Architecture of BSSR Gosstroy and the Minsk Production Association for Industrialized Construction of Apartment Houses of BSSR Minpromstroy in collaboration with the associations of the Minsk Tractor Plant, BelavtoMAZ, the Machinebuilding Plant imeni Kirov, the Machinebuilding Plant imeni Oktyabr'skaya Revolyutsiya, the Molodechno Metal-Structure Plant and other enterprises.

The second line was created at the Minsk Asphalt-Concrete Plant by the same institute and by the Administration of Road and Bridge Construction and Civic Improvements of BSSR Minzhilkomkhos [Ministry of Housing and Municipal Services], in collaboration with the Minsk Plant for Automatic Lines, the Stroy mash [Construction Machinery] Association of BSSR Minpromstroy, the Gomel' plant Sidroprivod and the Minsk Electrical Equipment Plant imeni Kozlov. Although the lines still have not been earmarked for an industrial operating regime, even today the promise and originality of the structure-technology solutions, which are protected by many invention patents, are obvious.

According to estimated indicators, some of which have already been confirmed by the results of industrial-test mastery of production lines, the industrial techniques that have been adopted and the electronic control systems that have been created should provide for a 1.5-fold to 2-fold increase in labor productivity and a 1.2-fold to 1.3-fold increase in strength of the concrete, an improvement in product quality, a 25-percent reduction in the consumption of reinforcement steel, and a 1.5-fold to 2-fold reduction in the consumption of heat and energy resources. And, probably the most important thing, working conditions that eliminate the production noise and vibration at workplaces that are so typical of all prefabricated reinforced-concrete plants have been created on these lines, and concreting workers have, for the most part, been replaced by machine and mechanism operators.

Such an approach to solution of the technical problems corresponds completely to the CPSU Central Committee's draft for the 26th party congress, "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990," particularly wherein it is planned, "to make profound transformations in the most important sphere of people's vital activity—work, to improve and facilitate working conditions, to provide broad opportunities for highly productive and creative work, and to advance greatly along the path of eliminating the existing differences between mental and physical labor..." This approach should be developed in every possible way with execution of the major program for reequipping and rebuilding the republic's plants for prefabricated reinforced concrete.

The base of experimental production that has been created under the Institute of Construction and Architecture of BSSR Gosstroy, at which not only has equipment for producing effective constructional structure been manufactured but also test runs have been made of such structure, helped greatly in fulfilling individual program tasks successfully. However, this base still does not meet rising demands, and it seems to us that review of questions associated with its development and technical reinforcement should be speeded up.

Unfortunately, the technical and economic indicators planned have not been achieved for all Program 19 tasks, not all the scientific and technical developments have

been worthy of construction practice. For some tasks, research was curtailed because of lack of promise or urgency of the directions and of the engineering decisions that were adopted. These were the creation of a prestressed porous-agglomerate large-dimension concrete slab for roofs and structure, made of polymer concrete based on carbamide resins.

The problem of creating corrosion-resistant and electrical-insulating structure with reinforced fiberglass plastic reinforcement is still far from being completed. The work program for the 10th Five-Year Plan called for the execution of a large set of operations aimed at creating new and effective structure based on polymer concretes and introducing them into construction practice. Meanwhile, only electrically insulated cross-arms for 6-10 and 35 kw [sic] electric-power lines and electrolytic baths for chemical-industry enterprises were created during the five-year plan. Also, questions of the flame resistance and chemical resistance of structure with fiberglass reinforced plastic reinforcement were not solved.

Developments for creating technology for the manufacture of reinforced-concrete structure made of high-strength concrete did not receive wide industrial introduction, although various methods, recommendations and industrial measures and equipment had passed industrial testing under the conditions that existed at various enterprises. In the next few years these developments should be realized in unison at enterprises of the republic's Minpromstroy and Minsel'stroy.

The efficacy and effectiveness of carrying out the program could be considerably increased where there is observance, throughout all tasks, of the integrated approach with specific orientation to the final results, of close interaction of specialists of interdependent trades, of precise coordination of the work of all participants of the continuous chain of the engineering process: research, design development and industrial introduction. For this purpose, the role of the supervisors of the research topics--the practical organizers of the whole set of developments and the coordinating councils on problems--should be raised considerably. It is these supervisors who have been called upon to decide responsibly all the organizational, financial, scientific and technical questions that arise during the creation of new equipment and the realization of research results.

The scientific and technical potential that has been gained as a result of the work on Program 19 should in the next few years find large-scale embodiment in construction practice. For this purpose, USSR Gosstroy plans to examine jointly with concerned ministries and agencies the results of the work on all the tasks and programs and to determine the amounts of industrial introduction of the scientific and technical developments that have successfully passed experimental verification.

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CSD: 1821

CONSTRUCTION

DIRECTOR OF DESIGN INSTITUTE DISCUSSES WAYS OF IMPROVING ARCHITECTURAL DESIGN

Moscow PRAVDA in Russian 17 Dec 80 p 3

[Article by A. Tatygulov, director of the "Kazgorstroyproyekt" Institute and honored builder in Kazakh SSR: "Our House, Our Street"]

[Text] In Leonid Il'ich Brezhnev's book "Virgin Soil" there are these lines about Alma-Ata: "This is a vast modern, beautiful and distinctive city with a population of almost a million. It is being built with a broad scope, according to a well thought-out plan and, I would say, with love. You will not see dismal monotonous city blocks here, the architecture of the new buildings is original, and no large building is a repetition of another."

Workers in our institute, which recently became 50 years old, perceived these words as the highest evaluation of our work. During the last half century the collective was able to make a noticeable contribution toward the formation of today's appearance of Kazakhstan's capital and of other cities in the republic.

The most weighty results were achieved during the 10th Five-Year Plan. The economic effect from adopting new technology comprised almost 7 million rubles and the estimated cost of construction was reduced by 10 million rubles. We were able to meet the five-year goal for volume of design work as far back as March of the current year. But you cannot express the most important results in numbers: the architectural approaches have become more interesting and original; the majority of them, and most of all the work of modern urban developers, is distinguished by creative boldness and expressiveness. It is sufficient to gaze at a model of future Turkestan, one of the most ancient of Kazakhstan's cities, in order to be convinced of the originality of the authors' concepts and their ability to create modern forms along with the best of the heritage from the past.

I am speaking about our successes in order to emphasize: the collective of "Kazgorstroyproyekt" is able to do large-scale jobs, to work fruitfully in the spirit of the lofty requirements that are stated in the draft of the Main Directions: "To increase the quality of planning, architectural, and construction decisions, to reduce the cost of erecting buildings and structures as well as housing units...."

Work has been done on the problems of large panel, modular section and monolithic housing construction in the institute for a long time in close collaboration with

structural designers and a search is also being conducted by housing construction combine workers for the most perfect and economical types of housing units. For instance, a design is being worked out in a typical design studio for an original 10-story monolithic housing unit in which the apartments are situated on two levels. The spacious dwellings and improved comfort advantageously distinguishes this housing unit from those that are being built at the present time and it was not for nothing that the collective which authored it was given third prize in the all-union "Future Housing" competition. This future, though, is not far distant--in the next few years many Alma-Ata residents will be able to celebrate housewarmings in such housing units.

However, quite a few obstacles still remain on the way to realizing the most advanced schemes. Take monolithic housing construction. Calculations show that it is the most promising and advantageous in the seismically hazardous zones in Southern Kazakhstan: capital investments for a production base are reduced by 30 to 45 percent, steel consumption is 20 to 25 percent less (in comparison with large-panel housing units) and general expenditures are 7 to 8 percent lower. Nonetheless, monolithic concrete buildings are being erected only as an experimental procedure. The fact of the matter is that construction organizations are little interested in mastering new designs and see them as a hindrance in fulfilling their plans for volume in rubles.

For the work of builders is still evaluated in a lump sum. Under these conditions the higher the cost of construction components the easier it is to fulfill the plan in rubles and the more advantageous this is for the trust. It readily assembles steel frames for buildings and uses reinforced concrete more extensively all the time.

But in the interests of the national economy monolithic components, which are less expensive than reinforced concrete, must be used more extensively. Along with this it is necessary to reduce the time for adopting more valuable innovations, to work out documents more quickly, and to introduce new construction methods.

Scientific research organizations--by their nature a proving ground for the practical implementation of new ideas--have shown themselves in a good light in a number of sectors. In our view the knowledge which has accumulated should be better utilized. For example, create design and construction associations where a design institute will act in the capacity of chief enterprise while several construction and installation administrations start to convert the ideas of architects into metal and stone. Another system is also possible--experimental designs that are worked out by various institutes would be implemented by one construction trust. But one way or another, designers must have a permanent production base. In such a case the possibility will emerge more easily of mastering the technology that started with a housing unit series at less expense and of giving precise recommendations to contractors.

It goes without saying that the discussion is not only about new organizational forms. Practice shows that many builders do not sufficiently examine the problems in architecture or the peculiarities of designs, and do not picture the goals for which the developers are striving very well. Perhaps short-term courses for administrators of construction subdivisions would be a big help--regular meetings of architects with those who implement their designs would help them to better understand each other and mutually enrich and broaden their horizons.

This is why we suggest adding a "Capital Construction" section to the draft of the Main Directions in the following manner: "Develop experimental and experimental model construction more extensively and strengthen the creative interrelationship between design and construction organizations."

I would like to pause on the following problem. In order to improve construction sites in cities and villages creative competition is of no small importance, during the course of which the most interesting architectural, planning and structural ideas manifest themselves. In particular, it is precisely on the basis of competition that the designs for many of the buildings which now adorn the center of Alma-Ata are completed. However, creative competition among architects is fruitful only when working out individual designs. As far as "everyday" buildings go--housing units, schools, hospitals, etc.--the creative imagination of the authors often sales and falls back on a secondary plan. In the CPSU Central Committee and USSR Council of Ministers decree concerning an improvement in the economic mechanism, it notes that the design for structures and complexes intended for civil housing construction should be done, as a rule, on a competitive basis. But in the time since this document was published no noticeable changes have occurred. We believe that USSR Gosstroy and other directive agencies should accelerate the development of the programs and conditions for such competition in order that by the beginning of the new five-year plan the possibility will already emerge of carefully selecting designs from among the best ones. It would have been expedient, in our view, to include a reference to creative competition for designers--this, without a doubt, will aid in accelerating the adoption of innovations into practice.

People in our profession must, in my opinion, follow the precept of physicians, "Do not harm." Do not harm the individual, the environment or nature and strive to harmoniously combine nature with what is manmade, ensure not simply the safety of the structure but also a high level of comfort in the structure and its exterior attractiveness. In other words, the designer cannot just be a narrow specialist; he must possess the principles of sociology, demography and ecology. And especially economics. It is precisely the economy of designs that has become one of the principal criteria in our day and an architect's skill is now in finding the optimum composition of various parameters and in selecting the single correct approach among the many variations that is directed toward maximum effect with minimum expense. But are the architect's words always determinant? Unfortunately, this is not so. Builders near and far disregard the authors' requests, act according to their own judgment and bear no responsibility for this. And while quite a bit is being done in Alma-Ata itself to strengthen creative collaboration between designers and builders, in many other places the situation leaves much to be desired. Therefore, we consider it necessary to make one more addition in section seven of the Main Directions: "To increase the supervision of the design organizations who are the authors over the quality of construction and not to permit buildings and structures to be turned over for use without the authors' participation."

The peculiar nature of architects' work consists of the fact that they are obliged to see many decades into the future; the buildings that are erected today must serve our grandchildren and great grandchildren. We must answer to the future and must work in such a manner that we deserve to be remembered with gratitude by our descendants. Our collective continually strives toward this end.

CONSTRUCTION

REORGANIZATION OF VOLGA CEMENT-MACHINEBUILDING PLANT URGED

Moscow *SOTSIALISTICHESKAYA INDUSTRIYA* in Russian 15 Oct 80 p 2

[Article by I. Bazarnyy, director of the Volga Cement-Machinebuilding Plant (Tol'yatti): "Space for Maneuvering"]

[Text] The Volga Cement-Machinebuilding Plant is one of the largest enterprises of *Minstroydormash* [Ministry of Construction, Road and Municipal Machine Building]. And although it already exceeds almost 3-fold the average size of first-category enterprises, it continues to grow. A high-capacity second foundry complex is under construction. Next is the erection of a building for producing a family of crawler construction cranes with a load-lifting capacity of 60 to 300 tons.

Why am I saying all this? The control system for such a complicated industrial complex cannot be effective if it is built according to the principle of strict centralization, as has been adopted for small and medium-size enterprises. Unfortunately, we became convinced that this is the case on the basis of our own experience: deficiencies in the system for controlling the enterprise were the chief reason for the failure of the program and for the worsening of economic indicators in 1972. Then we managed to find a way out--the VAZ [Volga Motor-Vehicle Plant] experience prompted it. Following the example of the vehicle makers, we created new structural subunits--production facilities. Their managers were given fairly broad rights. The board now was able to analyze and solve important problems for developing the plant and to follow performance discipline strictly--that is, to pay greater attention to strategy, without which it is simply impossible, after all, to run a business on such a large scale.

However, it cannot be said that we managed to improve radically the administrative structure. As is well known, the life cycle of industrial production consists in four stages: research, design and development; manufacture; realization; and operation. It is best of all if control thereof is concentrated in one hand. And what happened to us? The plant is engaged only in the manufacture and realization of its output. And two organizations stand right off at the sources of its creation: research and design are conducted by the industry's *VNIITsemmash* [All-Union Scientific-Research Institute for Cement Machinebuilding], which is located here in Tol'yatti, while our working drawings are prepared by the plant's developers.

Thus, the first stage of the life cycle of the products proved to be artificially broken up. But the main thing is that the specialists who stand on both sides of this gap, are supervised in their work by different and, at times, even

contradictory interests. The institute's workers, for instance, cannot (and they do not even try to) consider all the plant's industrial potential so it can be used fully. They practically do not take part in mastering the production of new equipment. And this leads to a different sort of disjointedness, because of which the coordination and approval of engineering tasks and designs are drawn out. The plant's specialists often have to radically rework the institute's documentation and re-coordinate previously approved designs.

At the same time, since all the papers on installation and operation of the equipment are concentrated in the plant's services, the institute's staff workers cannot objectively evaluate the merits and defects of their designs. Their potential for participating in refining and upgrading the quality of the equipment and its technical level, reliability and longevity is limited.

As a result of all this, the deadlines for creating new machines is drawn out intolerably. Thus, more than 15 years were required for the fabrication of an experimental line for making cement by the wet method with a productivity of 3,000 tons per day for the Balakleya Cement Plant!

And here is another example. Next year we should make a rotary kiln for the Achinsk Alumina Plant. This kind of equipment is being manufactured for the first time. VNIItekmash's participation was required for creating the preliminary design. But this work had not been planned for it. Nor could the institute do it rapidly as above-plan work.

It is more than obvious that the overwhelming majority of the miscalculations could have been avoided if a science-and-production association had been established, based upon the plant, which had overgrown its normal dimensions, and VNIItekmash. Such a reorganization would have permitted the interests of the scientists and production workers to be blended, duplication in their work to be eliminated, and available forces to be manipulated more flexibly. And the plant's management has for 5 years now been demonstrating the desirability of the restructuring. However, during all these years the ministry has not been able at all to make up its mind on such a step.

At the time a prestigious Ministroydormash commission comprehensively analyzed our proposals and studied the work experience of Uralmashzavod [Urals Machinebuilding Plant], it came to the conclusion that the creation of an association would be an objective necessity. But the specialists' conclusions still remained on paper. And this is, moreover, incomprehensible when it is considered that the CPSU Central Committee and USSR Council of Ministers decree, "On the Improvement of Planning and Strengthening of the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," poses the task of completing in the next 2-3 years the establishment of production associations as the basic cost-accounting element of industry.

I would like to add in conclusion that the forming of a science-and-production association to produce industrial equipment for the cement industry will enable us to concern ourselves with improving the operation of our machinery. Having regrouped forces, it will be possible to create a Volgotsemmashtekhnobsluzhivaniye [Association for Servicing Machinery Produced by the Volga Cement Machinebuilding Plant] and a spare parts center.

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CONSTRUCTION

RECOMMENDATIONS MADE TO UPGRADE LITHUANIA'S CONSTRUCTION PROGRAM

Vilnius SOVETSKAYA LITVA in Russian 10 Jan 81 p 2

[Article by S. Novshovich, manager of the Lithuanian Republic Office of USSR Stroybank: "Raise Capital Investment Effectiveness"; passages enclosed in slantlines printed in boldface]

[Text] During the 10th Five-Year Plan our republic's builders turned over for operation new capacity at heat and electric-power centrals, capacity for the production of ammonia and composite fertilizers, computer equipment, quarried construction materials, and dairy-industry capacity. The first phase of the Mazheykayay Oil Refinery was put into operation. In the one year of 1980 alone, fixed capital costing 1.7 billion rubles was introduced into operation.

The CPSU Central Committee's draft for the 26th party congress stipulates the necessity for turning production capacity over for operation on time. The republic's builders are doing much to cope with this task. For many production facilities are still being turned over with great delay, and this inflicts substantial damage on the national economy.

Erection of the Daugelyay Brick Plant for the Ministry of Construction Materials Industry, the republic's pharmaceuticals warehouse, technical and vocational training schools in Bal'berishkis and Varnyay, and so on, have been delayed. A total of more than 10 million rubles' worth of materials have been consumed on these facilities, whose construction began back in 1974-1976. And during all these years, these valuables have been frozen. As is said, they are not working, they do not serve the national economy.

Construction of Kaunas's Tsentrolit foundry and the Kazlu-Ruda Lumber Products Combine have been going on since 1959 and 1966, respectively. However, despite the partial introduction of capacity, the industrial readiness of these enterprises is still far from complete.

Often not enough attention is paid to completion of work on facilities that are due for startup. Paradoxical as it may be, some of the republic's Minstroy [Ministry of Construction] organizations fulfill plans at them worse than they do at facilities that are not due for startup. For example, in the first 10 months of 1980 the Shyaulyay Construction Trust realized 92 percent of the tasks for startup facilities and 98.4 percent of the tasks for facilities not due for startup; the Alitus Construction Trust realized 88 and 110.9 percent, respectively, Khimstroy [Trust for the Construction of Chemical Industry Facilities] 79 and 84 percent.

It is necessary, therefore, to insert the following sentence into Part VII of the CPSU Central Committee's draft for the 26th party congress: /Construction organizations should direct their efforts and resources primarily both to erection of the most important facilities and to completion of facilities due for startup."/

"The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990," calls for a restriction on the number of facilities to be erected simultaneously, a reduction in construction time, and a steady introduction of production capacity and of facilities into operation throughout the year. This poses the task of bringing the amount of uncompleted construction and the reserves of uninstalled equipment down to the norms in the next few years.

Appropriate steps toward this end already have been taken in the republic. Thus, by the end of 1981 uncompleted construction should be 52 percent of the annual plan. This is greatly below the standard. The number of facilities that are under construction simultaneously also is being cut. At the same time, it is impossible to avoid calling attention to the negative fact that the number of newly started construction projects for production purposes is rising: from 20 in 1980 to 26 in 1981, the new facilities are included in the plan at a time when fewer funds than are required for observance of the construction-time norms are being allocated to carryover projects. This situation prevailed during capital investment planning for 1981 for the ministries of local, furniture, wood-processing and other industries. This inevitably will later, as a result, lead to a growth in uncompleted construction, which is already higher than the norm in some branches of the republic's economy. For example, for the Ministry of Higher and Secondary Specialized Education, it is 124 percent, the Ministry of Culture--72 percent (while the norm is 62 percent), and for construction projects of the Committee for Vocational and Technical Education it is 87 percent (while the norm is 75 percent).

Because of this, Part VII of the draft of the "Main Directions" should be supplemented as follows: /"With a view to reducing uncompleted construction, require that enterprises pay into the budget 6 percent of the above-plan amounts of uncompleted construction at the end of the year."/

Much uninstalled equipment has been piling up at the republic's construction projects. And the amounts thereof are growing. An especially worrisome situation has prevailed at facilities of the Ministry for Domestic Services for the Public. As of 1 June 1980, the value of uninstalled equipment, including imported equipment, had quintupled since the start of the year. Nor had the situation improved by the end of the year. There is a situation almost similar at Ministry of Local Industry construction projects. For example, in January 1980, 403,000 rubles' worth of equipment was imported for installation in the bone porcelain department of Yesya, Kaunas's experimental plant for artistic ceramics. The deadline for its installation was January 1981. However, the engineering readiness of the department, which is being erected by SU-5 [Construction Administration No 5] of the Kaunas Construction Trust, is such that production space has not been prepared for installation of the equipment.

It would seem that the "Main Directions" should call for /the use of pecuniary penalties against organizations and construction projects that permit funds and above-standard reserves of equipment to be frozen./

The Lithuanian SSR has gained definite experience in the use of bank credit in construction. The Alitus Cotton Combine, the Vilnius Bakery and a number of other enterprises are being built on that basis. The Lithuanian Republic Office of Stroybank issues Lithuania's Ministry organizations about a billion rubles of credit annually. It is fully possible that in 1981 the method of clients and contractors making settlements for completed enterprises, complexes, phases and facilities due for startup will be spread to all the construction projects that we are financing.

In order to intensify this work everywhere, it is necessary that Part VII of the draft of the "Main Directions" stipulate /the necessity for the most rapid introduction of turnkey settlements into construction work./

In recent years the number of facilities at which the budget-estimated cost of construction has increased has grown appreciably. Thus, during the first half of 1980 the Vilnius city ispolkom allowed costs to rise at 6 construction projects by 2,853,000 rubles (17.6 percent), the Kaunas city ispolkom allowed such costs to rise by 147,000 rubles (3.9 percent), and so on. This is explained, first, by design organization error that occurred, for example, during construction of the Ionava Nitrogenous Fertilizers, the Letuva Hotel, and the bridge across the Neris, near the pedagogical institute in Vilnius. Second, by an increase in the budget-estimated cost for industrial equipment because of the replacement of domestic equipment by imported equipment (the first phase of the phosphoric acid department of the Kedaynyay Chemical Combine, the third phase of the Ionava Nitrogenous Fertilizers Plant, and the laundry at Raseynyay). Third, by change in the additional clients' tasks of approved design engineering solutions (the Vilnius Branch of ENIMS [Experimental Scientific-Research Institute for Metal-Cutting Machine Tools], a dining hall for the El'fa plant, and a school in Kaunas). Fourth, by the client's introduction, during construction, of changes aimed at improving the finish and decor of buildings (the department store in Druskininkay and the Palace of Culture in Yurbarkas).

Based upon what has been said, I consider it desirable to supplement Part VII of the CPSU Central Committee's draft for the 26th party congress /with a sentence strictly prohibiting an increase in the budget-estimated cost and reapproval thereof because of change of this budget estimate during the course of construction./

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CONSTRUCTION

USE OF DESCRIPTIVE DOCUMENTS FOR CONSTRUCTION COLLECTIVES DISCUSSED

Moscow PRAVDA in Russian 25 Dec 80 p 3

[Article by L. Bibin, deputy minister of USSR construction: "The Contractor's Descriptive Document; We are Discussing the CPSU Central Committee's Draft of the 'Main Directions for Economic and Social Development in the USSR during 1981-1985 and for the Period to 1990' for the 26th Party Congress."]

[Text] How is a construction collective represented? What capabilities does it have at its disposal? What work can it be entrusted with? Its descriptive document must give an answer to these questions. Up to this point construction subdivisions did not have such descriptive documents. The introduction of documents which certify the "true worth" of a collective is specified by the CPSU Central Committee and USSR Soviet of Ministers' decree concerning an improvement in the economic mechanism. This will aid in better planning and managing construction production.

The volume of work for this or that collective is still planned "by eye." And it is no coincidence that for certain trusts it increases by a factor of 1.5 to 2 in comparison with the previous year. Now, after publication of the decree concerning an improvement in the economic mechanism such a volitional method must be put to an end. The final result, the finished structure--this is what now determines the results of construction workers' labor. But we have to do laborious, complicated and responsible work for this--to compile the primary data for construction and assembly subdivisions' descriptive documents. The significance of such documents is very great. For they allow us to have a comprehensive conception not only about the level of the capabilities of this or that contract organization and about its strong and weak points but also about its existing potentials. With time it will turn out that we have a tool in our hands which will aid in better utilizing construction production capabilities.

The compilation of descriptive documents is a new thing. And there is no clarity in how to do the work most expediently or what data to include. Some suggest determining the capability of a contractor, for example, by originating with the availability of construction technology and others from the number of workers. Who is right?

Capital construction is one of the sectors of the national economy where much of the work has still not been able to be mechanized. The technology which is being turned out now and the hand tool, by their characteristics and possibilities of use, do

not allow this to be done. Of course, there are certain improvements. For instance, in comparison with 1975 the volume of earth work that is now completed by hand has been reduced by almost 25 percent, loading and unloading work by 27 percent, concrete work by 23 percent, plaster work by 24 percent, and painting work by 22 percent. Nonetheless there are those jobs which are difficult to mechanize. Even assembly operations that are fully equipped with modern lifting mechanisms and devices require people with high qualifications. And no matter how much and what type of technology there is it is impossible to manage without the corresponding number of experienced specialists.

This means that a contractor's capability depends most of all on the participation of the individual in the production process and on the personal work with which he is entrusted. Consequently, determining the capability of a collective must be done, in our view, according to the number and qualifications of the people. Especially since the level at which a contract organization is equipped with technology and a corresponding base can be calculated by the very same number of workers.

The fact that the existing machinery and mechanisms yard needs to be considerably renovated and enlarged speaks in favor of such an approach to the problem being discussed. As before an acute lack of minor means of mechanization and finishing machinery is being felt.

This, so to speak, is the first and primary condition for compiling a descriptive document. And even further a reference index such as output in real means of measurement should probably be included in the calculation. And it, as is well known, depends on the level of mechanization for labor and the qualifications of the people, on the technology and organization of production and on providing the latest materials and structural components. This means that in the given case the principal types of operations which this or that organization carries out and according to which output in real means of measurement and the number of people is taken into account must be kept in mind.

In a word, in order to determine the capabilities of a contract collective such data must be used that are obtained as a result of its production activity. And it is not only all of the technical and economic services of a trust that must be enlisted in filling out the descriptive document but also associated workers as well. They should operate according to a uniform methodology which has been specially worked out.

Why are we supporting a real index? Most of all because it has already extensively spread to construction sites when evaluating the labor productivity of workers in the mass professions: brick layers, concrete workers, installers, plasterers, painters and other specialists. In our ministry, for example, the output of 60 percent of the total number of people who are called specialists is calculated precisely in such indices. They can be defined as an average output and, consequently, characterize the total organizational and technological level of production and the qualifications of the collective to some degree. Secondly, the price of materials and parts, transportation expenditures and other expenses that are related to pricing which continually are associated with the cost index do not affect the real means of measurement in any way.

Output in real means of measurement makes it possible to more reliably conduct current and long-term planning of crew operations, simplifies the comparability of the results, makes it possible to more fully reveal and analyze losses of time and non-production expenses and to take measures to eliminate them. Finally, the labor index in the real means of measurement is clear and understandable for workers. It increases their incentive in the final results. All of this taken together as a counterbalance to output, which is determined by the estimated cost, will better promote an acceleration in putting capacities and structures into operation.

In recent times we have been attaching much significance to introducing planning and calculating output in real means of measurement and are taking measures to spread this method more widely. But expanding knowledge requires a basic change in organizing labor. In particular the automated calculation of output by using computer technology is being persistently requested here. A daily or weekly public accounting of what has been done and determining the output of each member of a primary section is becoming compulsory in crews. At the Chuvash territorial construction administration, for example, we have already introduced an automated system of calculating output in real means of measurement. It aids in attaining a considerable increase in the standard of low level planning and management of production, opportunely reveals and eliminates deficiencies in organizational affairs, and more fully utilizes internal potentials. Now, on the basis of the first step, the ministry is adopting a uniform method of planning and calculating output in real means of measurement by using computers.

What is said, certainly, does not mean that it is not necessary to consider the production resources of an association or trust when compiling a descriptive document. Machines and mechanisms, the presence and condition of a base, in a word, everything that promotes an increase in labor productivity should, without a doubt, be kept in mind when determining its capability. It is necessary to use the pure production standard index as well in order to thereby exclude the effect of varying prices on building materials.

USSR Gosstroy and the construction ministries are now working out the methodology for determining and planning the production capability of a contract organization. There are still differences in principle between the participants who are developing this about the basic problem. And therefore we consider it necessary to once again emphasize that it is simply impossible not to consider the qualitative and quantitative composition of labor resources for the sector's level of mechanization and industrialization which has been achieved and which is expected as it is impossible to mechanically transfer the methodology for determining capacity from an industry to capital construction. Otherwise the capability of contract organizations will again be over-evaluated in many ways as was done, unfortunately, during the 10th Five-Year Plan. All of the conditions that are stated in the descriptive document are, without a doubt, aimed at achieving high final results and at putting structures and capacities into operation on time.

Another no less important section should be in a construction association's descriptive document which will characterize the collective's upcoming workload. However, before expressing our observations on this section, we should turn our attention to one more important problem. Up to this point we have been speaking about the form

and content of the descriptive document. But it is also important that it be periodically filled out. In their draft of a descriptive document USSR Gosstroy's scientific research institute on the economics of construction suggests filling it out "annually no later than ten days after the annual report of the above organization is turned over." In practice this means at the beginning of March. And what does such a timeframe bring about?

With such a timeframe the descriptive document will in fact reflect the organization's capability which it achieved during the previous year. Can this be taken as the basis for planning during the following year? In our view it can but with certain corrections. The first assumption that should be made is that the capability of the trust will increase by a maximum of 3 to 5 percent for the current year. If, of course, no additional personnel or production resources are allotted. The second condition is that if additional growth occurs during this period then it will be a potential for the given organization, which will make it possible for it to overfulfill the plan with less expenditures and a savings in labor. As to how periodically the descriptive document is filled out, an annual update will not cause any argument.

And, in conclusion, there are several problems which, in our opinion, deserve attention. In order to obtain a more efficient final result, information such as the projected amount of capital investments and work for developing an internal base, the volume of incompleted construction at the end of the current year and the plan for putting structures and capacities into operation should be included in the descriptive document. For this, one must have a start-up program for two years at the maximum.

And there is yet another consideration. In our view, information concerning the predominant type of structures that the contractor is building should be contained in the descriptive document without fail. Say industrial, including chemical, metallurgical, machine building, agricultural, housing and cultural and everyday service structures.

There is still one question; the structure of work has considerable significance for the contract organization. The smaller the organization the greater that the improvement can be and the more strongly this factor influences its capability. This must also be reflected in the descriptive document. How? It should be thought about. Maybe take it into consideration by a system of special coefficients. In such a case the contractor and client can, by also considering the components in the descriptive document, determine the estimated nominal volume of construction and installation work for the planned year without particular difficulty along with the growth relative to the expected work to be completed during the current year only for that amount by which the collective is obliged to increase labor productivity and in the amount that its capabilities will grow. Simultaneously (in the case where there are excessive work loads) it will also be easy for the parties to see what types of work should be excluded during the planned year and for what reason. A collective's descriptive document will aid in avoiding planning from that which has been attained.

What is intended is that the availability of descriptive documents that are comprehensively worked out for construction subdivisions will aid us in putting planning for capital construction in good order and will promote an increase in its efficiency. In other words, capital construction will emerge onto that main highway which was specified by the CPSU Central Committee's draft for the 26th Party Congress.

9495

CSO: 1821

CONSTRUCTION

WAYS OF IMPROVING EFFECTIVE USE OF CAPITAL INVESTMENTS DISCUSSED

Moscow PRAVDA in Russian 10 Dec 80 p 1

[Article: "Construction Program for the Five-Year Plan"]

[Text] Our national economy is a complicated multi-sector complex. Construction occupies one of the foremost positions in it. During the 10th Five-Year Plan alone capital expenditures for the national economy comprised 635 million rubles. Basic production funds increased by a factor of 1.4. More than 1,200 large industrial enterprises were formed and Soviet people obtained 530 million square meters of living space.

Construction workers have to realize a tight program during the 11th Five-Year Plan. The total amount of capital investments is projected to increase by 12 to 15 percent, according to the draft by the CPSU Central Committee for the 26th Party Congress. And the most important goal is to effectively utilize funds, to improve the quality of structures and to put them into operation more quickly. This can be achieved in many ways by means of improving the system of planning and management by the sector.

The party is showing clear, precise ways to reach these goals. A significant portion of capital investments is first of all being directed toward reconstructing enterprises and reequipping them with technology. This is one of the important approaches for developing industry during the 11th Five-Year Plan. The example of collectives in Moscow, Leningrad, and Ivanovskaya, Zaporozhskaya and Kuybyshevskaya oblasts testifies to the great economic advantages of reconstruction. For instance, due to the technological renovation of their factories and plants alone textile workers in Ivanovskaya oblast were able to achieve an increase over the last 10 years of 800 million rubles in the products that are turned out without increasing the production area or the number of workers. Industrial and construction ministries have to specifically define the reconstruction plan of each enterprise and strengthen them with the necessary material and technological resources. In the regions where these operations will be based--in the Urals, the Ukraine, in Belorussia, the industrial center and in other areas--it is impossible to manage without specialized construction and installation subdivisions.

Capital investments are distributed with maximum consideration given to the principles of territorial and sector planning. This will make it possible to project and successfully realize large-scale comprehensive programs, especially in the eastern part of the country which is rich in raw materials. Kansk-Achinsk, Pavlodar-Ekibastuzskiy,

Sayanskiy, Zapadno-Sibirskiy, Ust'-Ilimskiy, and other territorial industrial complexes will be further developed and new hydraulic and thermal power plants and a number of energy-consuming enterprises will be erected. In the European part of the country nuclear power will grow, as before, at a rapid pace. As is well known, bureaucratic infighting and the procedural system are often the factors that are holding back the successful completion of such programs which leads to overextension of resources. It is expedient, as is apparent, for USSR Gosplan to review the systems for developing territorial complexes and to approve projects irrespective of the departmental jurisdiction that is in force in the enterprises' region.

A concentration of capital investments and a reduction in incompleting production aid is also sharply reducing the number of newly begun construction projects. The draft is aimed most of all toward completing structures that were previously begun. New capacities will be created only in the event that the requirements of the national economy for a particular type of product are not satisfied due to the full utilization of those that are existing. Such an approach will improve construction affairs and make it possible for the sector to increase its contribution toward the development of the country's economy.

The course for increasing the effectiveness of capital investments presupposes a further improvement in management by the sector as well. It is specified that it will transfer to a two or three section form of management where large associations become the principal sections. Their plans must be strictly coordinated with material and technological capabilities and labor evaluated by the end result. Not the amount of funds that is put to use but how completely and the time in which a structure is completed and turned over to the client--this is the aim of the construction collective. The experience of Belorussia and Latvia, where the system underwent experimental testing, confirmed its economic effectiveness. During the 11th Five-Year Plan, the entire sector will transfer to the new method of management.

Over the five years construction workers have to increase labor productivity by 15 to 17 percent. In order to achieve this most important planning index they must work quite a bit. Productivity in the sector is still low and the reasons for the lag are well known. These are poor labor discipline, idle time due to uneven deliveries of materials and a low level of mechanization. USSR Gosstroy, its scientific collectives and the Ministry of Construction, Road and Municipal Machine Building are called upon to help correct matters. Their obligation is to arm the creators of new factories and plants with the necessary technology besides all of the overall work--from the foundations to the finish work for the buildings. Crew cost accounting, the Orlov system of uninterrupted planning, the method of "workers' competitions" and other know how should be more actively introduced which aids in strengthening the collective, and increasing labor productivity.

Like all Soviet people construction workers are ardently and with interest discussing the CPSU Central Committee's draft for the 26th Party Congress. They are making suggestions that are intended to increase the effectiveness and quality of work, improve the economic mechanism and reveal deep production potentials. It is the duty of party and trade union organizations to see to it that everything that is of value which promotes an increase in the effectiveness of capital expenditures, reduces the time for reconstructing and building enterprises and improves matters in the sector is reflected in the counter plans and socialist obligations.

A large role in realizing the party's social and economic program belongs to construction workers. They are filled with determination to do the tasks that stand before them. There is everything in the sector to do this--remarkable personnel, fine expertise and a corresponding material base. Now the most important thing is to concentrate our efforts on successfully completing the 10th Five-Year Plan, preparing the anticipatory work for working at the greatest possible speed from the first days of the new year and expanding competition for a fitting greeting to the 26th CPSU Congress even more extensively.

9495

CSD: 1821

CONSTRUCTION

RAISING EFFECTIVENESS OF CAPITAL INVESTMENTS BY DETERMINING CORRECTLY COST ESTIMATES

Moscow EKONOMIKA STROITEL'STVA in Russian 1981, pp 42-44

[Article by Yu. A. Kus'mich, engineer] "Correct Determination of Cost Estimates: The Route to Raising the Effectiveness of Capital Investments"

[Text] One of the basic tasks in capital construction, which must be solved in accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 "Improving the planning and strengthening the influence of the economic mechanism upon raising the production efficiency and work quality", is to speed up the putting into operation of production capacities and projects and to raise the effectiveness of capital investments.

Data derived from research of the USSR Central Statistical Administration show that out of more than 2,700 projects that were put into operation in the period 1976 to 1979, only one third of the enterprises and construction projects were completed within standard time periods. The result of the systematic lag in handing over fixed assets for operation for each ruble invested in the Ninth Five-Year Plan only 93 kopecks worth of work was actually completed. In the Tenth Five-Year Plan this figure was 92 kopecks, although the plans consistently call for the second indicator to be exceeded.

The late completion of fixed assets causes a disproportion in the development of the national economy. Estimates show that the delay in completing new capacities by only one month leads to a total loss of more than 2 billion rubles of income for the national economy.

The stability of cost estimates for construction is crucial for raising the effectiveness of capital investments and for ensuring that production capacities and projects are put into operation on schedule. The situation in this regard is very unfavorable. Thus, according to data of the USSR Stroybank [Construction Bank] the growth in cost estimates was nearly 40 billion rubles for just three years of the Tenth Five-Year Plan.

The growth in cost estimates for the construction of enterprises and other projects according to approved planning and estimate documentation in comparison with the estimated used in drawing up the five-year plan (estimated cost of construction), creates disproportions in the national economy and leads to the breach of state planned balances for the distribution of labor and material resources and to the disruption of putting enterprises and projects into operation. All of this does injury to the national economy, on a scale that considerably exceeds the amount of growth of cost estimates.

Analysis shows that in the total growth of cost estimates the individual reasons for this growth are:

53 percent - the review of plans to increase the capacity of enterprises, changes in list of products to be manufactured and the creation of new facilities. They may say that such a review provides an increase in capacity and improves the technical-economic indicators of the enterprise that is being built, and so forth. However, an analysis performed by the USSR Stroybank demonstrated that of the total number of plans examined with an increase in cost estimate, only 59 percent were reaffirmed with a relative improvement of the technical-economic indicators. And this did not take into consideration the fact that when evaluating such plans, as a rule, no consideration was given to reducing the effectiveness by postponing the time periods for putting the construction projects into operation, which cannot be avoided when increasing the cost estimate. In addition, no thought was given to the injury done to the combined facilities and sectors of the economy and the damage that is connected with the disruption of planned time period for product deliveries;

15 percent - the increase in the cost of equipment. The careless work-up in the initial stage of planning leads in many cases to a situation whereby plans incorporate untested equipment and poorly studied technological processes;

15 percent - the review of plans connected with including measures to protect the environment, improving the cultural and living conditions of enterprise workers, and so forth;

10 percent - the review of plans to bring them into line with new planning norms. The basic reason for forming a large amount of planning documentation that has not been used for a long time in construction, including documentation that is completely out of date, is that the construction work takes a long time;

7 percent - correcting the mistakes of the planning and surveying organizations and amending work volumes for the working blueprints.

The above figures show that the majority of the reasons for the growth in cost estimates are the direct consequence of careless, pre-planning study.

Why is such a situation allowed when it leads to a growth in cost estimates for construction and, as a consequence of this, to the breach of planned time periods for the completion of construction projects?

To ensure the continuity of plans for capital construction and raising the responsibility of customers and contractors for the timely completion of production capacities and construction projects the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 called for the drawing up and approval within the five-year plans of lists of new construction starts on enterprises and facilities, as well as lists of enterprises to be modernized and expanded, with some indication of their basic technical-economic indicators. One of these indicators is the cost of the construction or modernization of the enterprise or construction project.

Under the existing system for drawing up capital construction plans the estimated cost for the construction of enterprises and projects, which are included in these lists, is determined according to consolidated estimate norms and indicators for similar construction projects, frequently without taking into consideration the specific conditions of construction, which results in it not reflecting a large amount of needed expenses. The cost estimate for their construction or modernization, which after approval is an unchangeable limit throughout the entire period of construction, is determined by the planning organizations only when drawing up the plan, i.e., after these lists of new construction starts and existing enterprises and facilities earmarked for modernization and expansion, have already been approved within the five-year plans.

Thus, considering that by the time the plan is compiled for the five-year plan, the USSR Gosplan, the ministries and departments have planning and estimate documentation, as a rule, only for the first two years; and the actual cost estimate for construction or modernization of the greater portion of the projects is determined after the plan has been compiled and approved. This means that many ministries, departments and union republics often make intentional "mistakes" in determining the estimated cost of construction to stay within the limits of the corresponding cost ceiling. As a result the majority of construction projects is listed in the plan for construction as "below-limit", i.e., as projects not requiring the coordination of the USSR Gosplan and other central organs for beginning construction. The estimate is simple: one way or another the cost estimate for the projects will be amended and, as a consequence, the plan will be adjusted, but by that time the construction project will have gotten into the plan and sooner or later the needed funds will be released for it. In addition, since the estimated cost of the construction in the majority of cases is less than the cost estimate, it will be possible to include in the five-year plan a significantly larger number of projects than would have been included at the time that the plan was compiled even if the cost estimate had been correctly determined. Thus the plan already incorporates a dispersion of assets; this dispersion in the course of fulfilling the plan results in the time periods for building many enterprises significantly exceeding the standard time periods,

and the growth in real estimated cost means that the construction of many projects will not be started.

The plan is a law that requires strict discipline in execution at all levels of economic management. The compilation of a plan, which knowingly will have to be adjusted, in many cases leads to an irresponsible attitude toward the plan. It can lead to the disruption of the smooth operation of a group of enterprises and even entire sectors of the economy. It can weaken the plan management of the national economy and can disrupt the directive nature of planning because the plan adjustment of a ministry or department means that a specific disproportion is introduced into the economy and that the interconnected estimates and indicators are disrupted. In other words, it is the start of a chain reaction of disruptions to planning discipline.

Thus, the correct determination of the cost estimates of construction and modernization projects is a necessary step toward speeding up the implementation of production capacities and raising the effectiveness of capital investments.

How can this problem be solved? Only by realistically determining the cost estimate of construction or modernization projects. And only under the condition that the planning organizations and plan developers prior to the approval of the lists of new construction starts and existing enterprises and facilities intended for modernization or expansion approved within the capital construction five-year plans, will fulfill a specific amount of planning work with consideration of the specific conditions of construction. The most effective way, in our opinion, to do this would be to use the system of territorial planning organizations of the USSR State Committee for Construction Affairs, which was created in accordance with the administrative division and economic regionalization of the USSR.

A system of such organizations, which have not only the responsibilities but the rights to conduct a unified state policy in construction, must along with the sectoral ministries and departments, the republic councils of ministers and their planning organizations be in charge of drafting the documentation which must justify the actual cost of construction for it to be included in the five-year plan. By having the knowledge of the specific conditions of construction in its region, the needed skill and legal rights to solve interdepartmental conflicts, these territorial planning organizations will be able to most objectively evaluate or determine the cost estimate for construction at the pre-planning stage. Naturally, such work ups will require appropriate expenditures. To answer the question about the advisability of these expenditures it is necessary to compare their cost with the losses that the national economy incurs if such work-ups are not done.

In the Tenth Five-Year Plan capital investments in the national economy amounted to 635 billion rubles. If one considers that the expenditures for planning, commencing with the first plan proposals and ending with the final blueprint, according to data of the Central Scientific-Research Institute of Industrial Buildings of the USSR State Committee

for Construction Affairs, account for approximately 2 percent of capital investments, then total expenditures for these purposes for the five-year plan will amount to nearly 13 billion rubles.

Based on the experience of leading planning institutes of the USSR State Committee for Construction Affairs (Promstroyproyekt /Institute for the Planning of Industrial Construction/, Goskhimproyekt /State Planning Institute for Chemical Enterprises/ and Planning Institute No. 2), in order to come up with a realistic cost estimate for construction or modernization of a project considering the specific conditions for their accomplishment (ground conditions, the availability of local construction materials, the supply of power and people resources, the preservation of the environment, and so forth) it is necessary to fulfill 20 percent to 30 percent of all planning. Consequently, in order to determine a realistic cost for construction or modernization of projects for the Tenth Five-Year Plan it would have been necessary to spend 3 to 4 billion rubles. If one considers in this regard that when compiling the five-year plan for the first two years of the five-year plan there is an approved planning documentation (working blueprints and estimates), then this sum will be even less. This demonstrates that the savings for planning work has resulted in a growth in cost estimates, which, as indicated above, was only 40 billion rubles for the three years. The savings have also led to the late completion of fixed assets, which results in a reduction in effectiveness of capital investments.

Various specialists are now arguing about at what stage the cost estimate for construction must be determined. Some say that the technical-economic estimates must be done which will be incorporated into the plans for the development and siting of production forces among the economic regions and union republics. Others say that this is impossible at the stage of compiling the plans and it is necessary to make these estimates at one of the planning stages. But no matter what we call these stages and how much we argue, the requirement has to be fulfilled: before the lists of new construction starts and modernization and expansion of existing enterprises and facilities are approved within the body of the five-year capital construction plan, a realistic cost estimate of these projects taking into consideration the specific conditions of construction must be determined. Without performing this work it is impossible to compile a stable plan that can realistically be fulfilled while maintaining effective control.

To perform work in determining a realistic cost estimate it is necessary to project the needed financial resources. And the material motivation and evaluation of the quality of the work of the participants in the planning and construction must be directed so that the actual construction cost of the enterprises and facilities was equal to or below the cost stipulated in the approved lists of new construction starts and the lists of existing enterprises earmarked for modernization or expansion which are within the body of the five-year plans. Also the basic technical-economic indicators stipulated in these lists must be observed or improved upon.

The compilation of balanced plans which are based upon a realistic cost estimate for the construction and modernization of projects, which is determined as the result of plan work-ups considering the specific conditions of construction, will make it possible to sharply curb the growth of construction cost estimates and to hasten the completion and implementation of production capacities and projects, thereby raising the effectiveness of capital investments.

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METALWORKING EQUIPMENT

CHANGE CRITERION FOR MACHINEBUILDING PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Nov 80 p 2

[Article by A. Tselikov, general director of VNIImetmash (All-Union Scientific Research Institute of Metallurgical Machine Building), academician, and A. Demidov, general director of the Elektrostal'tyazhmash Association: "It's Time for the Ton to Retire"]

[Text] For a long time now there has been a great deal of talk about the shortcomings of the existing system of planning machine production in tons. However, this indicator is a curiously tenacious survivor. Evidently, it is not so simple to abandon it. And this is understandable: without taking into account the weight of the equipment being produced it would be difficult for the planning organs to balance the needs for metal. However, practical management experience compels us more and more persistently to recognize the following fact: while this criterion remains in force, considerable harm is done to industry as a whole.

Under conditions of individual production such as, let's say, at the Elektrostal'tyazhmash, which manufactures rolling mills, the defects of planning in tons stand out in particularly sharp relief. And they are manifested primarily in the fact that the enterprise is concerned with producing very large, bulky, metal-consuming units which require less labor outlays per ton of equipment. As a rule, the plant has more orders than its production capacities and labor resources allow it to fulfill. And, therefore, it has the possibility of choosing what to do first. Let's consider, for example, a situation such as the following. Two orders come in: one is for the design and manufacture of a double-thread mill for the cold rolling of tubes, while the second is for a roller conveyor for a section mill for a sheet-metal mill. Most of the units are approximately equal, but the labor outlay on manufacturing the roller conveyor requires one fourth less. Which one will be preferred? Among managers the top-priority concern is for fulfilling the plan, and from this point of view it is more advantageous to start production on the roller conveyor.

But let's look at this same situation from a different point of view: what effect will the introduction of these units into production have? According to the calculations of the client ministries, the national economy will receive an economic effect of 250,000 rubles from the adoption of a double-thread mill for cold rolling, while in the second instance the effect will amount to only 80,000. And so what should be the criterion for guiding us in analogous situations so that we may correctly determine the priority of orders?

As such a criterion the designers of Elektrostal'tyazhmash have proposed the "coefficient of economic efficiency." It constitutes the ratio of the economic effect obtained from introducing a unit to its weight. And, it must be said, the application of this coefficient has allowed the association's group to be guided more correctly in the most rapid possible manufacture of advanced equipment. As a result it has created quite a few highly efficient machines which facilitate the introduction of advanced technology, as well as the increase of labor productivity at metallurgical enterprises. Examples of such machines include the axial-rolling unit for the Dneprovskiy Plant imeni Dzerzhinskiy, the tube electric-welding unit for the Vyksunskiy Metallurgical Plant, mills for producing tubular items, using technology with low amounts of metal wastes, etc.

At the beginning of the five-year plan the coefficient of economic efficiency at the plant amounted to 400 rubles per ton. The group set itself the task of bringing it up to 1200 by the end of the five-year plan. However, this stage was not reached; the coefficient was raised only to the level of 950 rubles per ton. And the reason for all this remained the notorious planning in tonnage.

Here is what is demonstrated by an analysis of a selection of the rolling equipment produced by the plant last year. The total weight of the commercial output amounted to 32,300 tons. But if we look closely at what specific machines it consisted of, the following fact comes to light: that portion of them which has a genuinely substantial effect on the national economy amounts to only 24,000 tons. And what about the rest? It is accounted for by orders which were fulfilled, for the most part, from somebody else's blueprints, in the majority of cases not even in line with the plant's specialization. Their sole merit was their great weight and small labor consumption. Could the plant turn down such orders?

Let's suppose that instead of the low-efficiency roller conveyors and other items, the enterprise with the same labor outlays had manufactured items which are in very short supply, such as stands for reduction mills, double-thread mills for cold rolling, and other advanced equipment. In this case the national economy would have undoubtedly turned out to be the winner: the economic effectiveness of the above-listed machines is much higher than that which was actually produced. But how would this have turned out for the plant? Inasmuch as the weight of the equipment turned out in this case would have been as much as 28,000 tons less, the plant's indicators with respect to fulfilling the plan in tonnage would have turned out to be correspondingly lower.

Certainly from what has been stated above it does not follow that the "insufficiently effective" machines are not needed by industry. Of course, they must be made also. It is primarily a matter of economic feasibility. In many instances such machines can be made by the repair services of the clients, as well as by enterprises designed to produce less complex equipment. But the capacities of the large high-technology plants should be utilized with the highest return on investment for producing efficient machines which cannot be manufactured anywhere else. But this is only possible when the technical policy of the enterprise is not made dependent upon an assignment in tonnage.

We must also note yet another undesirable consequence of such a system of planning. It is well known what importance is now being attached to savings on metal at all

stages of machine manufacture. A great deal of work on reducing the proportional metal consumption of equipment is being conducted by the designers and production workers of Elektrostal'lyashmash. Here are just two examples of this. Last year in the units for producing multilayered tubes use was made of rubber and polyurethane roller bodies instead of steel ones. Their weight was reduced by 65 tons. Another example is that 200 tons of metal were saved thanks to the fact that the operating stands of a tube electric-welding unit were designed to be made by welding. And the total weight of machinery manufactured last year was reduced by 1500 tons. It would seem that the plant's group had done a good thing: they saved for the needs of the state a considerable amount of resources which are in short supply. But serious difficulties arose for this very group in connection with this, because, of course, the production plan in tonnage remained as before.

And so how can we eliminate such paradoxes? Only by abandoning the existing system of planning. As we know, the decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism talks directly about the need to make the transition to planning the production of equipment in measurement units which more fully reflect its productivity and other economic characteristics, in particular, with regard to a standardized net output. The indicator of equipment production in tonnage should be retained only to calculate material outlays, so that it in no way affects the technical policy of enterprises. The thinking is that in planning, along with the indicator of standardized net output, we also need to utilize the effect on the national economy. The importance of this criterion consists in the fact that it reflects the quality of the machines being produced, as well as their technical level. In each specific case technical grounds should be provided for this effect and approved by the client.

But what can we expect from the introduction of this new system of planning the production of rolling equipment? First of all, a rise in the technical level of machines and units. Because not only the designers but also the managers of enterprises will be directly interested in the manufacture of new and improved equipment. Soviet industry will receive those mills and machines which it needs the most. The struggle to save on metal will also receive a significant stimulus. Without any backward glances at the plan in tonnage the designers will achieve a reduction in the proportional metal consumption of machines.

The increase in the unit capacity of units, machines, mills, the choice of an optimum technology, the reduction of equipment weight thanks to new design solutions, the use of economical types of rolled metal, the broad-based utilization of welded components instead of cast ones, etc.--all this will determine to an even greater degree the basic trends in designing equipment. And the result will be a sharp increase in the effect on the national economy.

According to calculations, for the 10th Five-Year Plan the economic effect of introducing rolling and tube mills produced by Elektrostal'lyashmash will amount to approximately 125 million rubles. If tons had not exerted a pressure on this enterprise's activity, this indicator would have risen to 150--160 million rubles. We have estimated what it would be in the 11th Five-Year Plan under the conditions of planning in the new manner. It turned out that there is a genuine possibility of obtaining as much as 180--200 million rubles of effect on the national economy from the introduction of machines.

Naturally, the transition to the new system will require the solution of a whole series of specific problems. But the main thing is that we need to abandon as soon as possible the system of planning in tonnage and to implement the tasks which the Party and government have set for us with regard to intensifying production.

RETAINWORKING EQUIPMENT

PRODUCTION DEVELOPMENTS THROUGHOUT USSR

Moscow KRASNAYA ZVEZDA in Russian 3 Jan 81 p 1

(TASS article: "Throughout our Homeland")

(Text) KHABAROVSK. A welded-components shop has been put into operation at the Khabarovsk Electric-Power Machine-Building Plant. With assimilation of this new production capacity, the enterprise will significantly increase its output of gas-pumping units, designed for constructing pipelines.

SHAMKHOR (Azerbaijan SSR). The Five-Year Plan for social development has been completely fulfilled by the workers of the Socialism Kolkhoz in Azerbaijan. More than 200 families have been provided with good-quality houses with private plots. For those who moved from the mountains to this village these homes were built using state funds. Housewarmings were also celebrated for the specialists and medical workers who came to work on this kolkhoz from the cities. The Five-Year Plans for economic and social development were also fulfilled by many other farms in this republic.

RIGA. The construction of an ice-cutting ferry has been completed at the Riga Ship-Repair Yard (Drydock). The "Primorets"--as the new vessel has been named--will operate on the Far Eastern crossings which connect Vladivostok with some fishing villages. This ferry can take on board 160 passengers and more than 40 passenger cars.

SVERDLOVSK. The output of a particularly strong film has been mastered at the Sverdlovsk Plastics Plant. No additional workers were needed for the new shop. By means of expanding the zone for servicing the equipment this enterprise's group freed up approximately 50 persons for new production.

KARSHI. A unified, automated system for controlling the republic's water-supply complex has been created in Uzbekistan. From the system's remote-control panel an operator controls the 75-kilometer "Moscow" Mainline Canal, which irrigates the lands of four rayons of the Kashkadar'inskaya Oblast. The system, which was installed in accordance with a plan of the Uzgiprovodkhoz Institute, is reliable and simple. It allows a reduction of half a million cubic meters in the daily expenditure of water for irrigation.

KHAR'KOV. The preparation of the soil-processing and planting inventory of equipment for the spring field operations has been completed by the mechanics of Khar'kov Oblast. On the farms plows, harrows, cultivators, and seeders were repaired not in open areas but in very large sheds (hangers). They were designed by specialists from the city, and manufactured and assembled in the localities by master

mechanics from industrial enterprises. The renovation of the equipment was carried out within compressed time periods and with a high level of quality.

UST'-KANENOGORSK. The production of heat energy has been expanded by the group of the Ust'-Kanenogorsk Lead and Zinc Combine. Here the electric-power engineering unit has been included within the system of centralized heat supply in order to utilize the heat which is formed during the roasting of zinc concentrates. The unit produces steam by means of cooling metallurgical gases. In this way the working conditions in the hot-forming shop have been improved.

2384

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METALWORKING EQUIPMENT

IMPROVE PRODUCTION, EFFICIENCY OF MACHINE BUILDING

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 11, Nov 80 pp 41-43

(Article by V. Mayevskiy, chief, Sector of Machine Building and Metalworking of NIIEMP (Scientific Research Institute for Economics and Planning): "Technical Level of Production and Efficiency of Machine Building")

(Text) Improving the efficiency of production and the quality of output, as was noted at the 25th Congress of the CPSU, is linked with solving many economic problems and, first of all, with speeding up the technical re-tooling of production, the widespread introduction of advanced equipment and technology, and the more economical utilization of fixed capital, material and financial resources.

It is well known that technical re-tooling and renovating existing enterprises constitute the principal factor in increasing the volumes of production and stepping up the growth rates of labor productivity. But how do matters stand in this regard at the republic's machine-building enterprises?

An increase in the proportion of the operation part of the fixed production capital testifies to a rise in the technical level of production. During the period of the scientific and technical revolution the rise of this indicator is an objectively justifiable principle, since an increase in the unit capacity of machinery and equipment, the creation of mechanized assembly and automated lines, the concentration of capacities by means of supplying them with highly productive equipment, and the observance of the necessary technical proportions between the individual stages of the technical processes of production output all permit more rational and complete utilization to be made of buildings and facilities, means of transport, and other elements of fixed capital.

During the 9th and 10th Five-Year Plans in our republic's machine building a tendency was observed toward the growth of the proportion of the operating part of fixed capital from 45.6 percent in 1970 to 51--52 percent in 1980 (anticipated level). According to preliminary calculations this indicator will reach approximately 55 percent by the end of the 11th Five-Year Plan. For machine building and metalworking as a whole the change in the proportion of the operating part of fixed capital has led (this is testified to by calculations) to an increase in return on investment by 7--8 kopeks.

One of the problems of raising the technical level of production is speeding up the rate of replacing obsolete and physically worn-out equipment. Unfortunately, during the last few years the annual replacement of obsolete metalworking equipment in the country's machine building and metalworking has been conducted within limits of 1.2--1.5 percent of the existing stock of equipment, as compared with a progressive norm of 6--8 percent. This is explained by the fact that the machine-tool building enterprises are still not able to supply the national economy with output in the necessary amounts and types. And what is the solution to this situation which has been created? Is it a general one?

In our opinion, this problem must be solved on a new technical basis by means of improving the technological structure of the stock of machine-tool equipment, increasing the proportion of highly productive types of machinery and equipment.

The reserves are also of no small importance--modernization of existing equipment. The facts testify that this significantly reduces the additional need for new machine tools, facilitates speeding up the rates of economic development and the increase in the efficiency of social production with the least possible outlays. All this, of course, does not exclude the accelerated development of machine-tool building itself.

The picture is somewhat different in the republic's machine building. Here the annual retirement of fixed production capital amounts to approximately 3 percent. Such a relatively high indicator of the retirement of equipment in machine building has been achieved, for the most part, thanks to the enterprises in instrument building and electronics, whose development during the present five-year plan has been conducted at an outstripping rate. The rapid renewal of the products being turned out by them, has, naturally, also been accompanied by improvements in the technological equipment.

On the whole, however, during the 10th Five-Year Plan the situation with regard to the retirement of fixed capital has become worse; obsolete machinery and equipment has accumulated at enterprises. Thus, at the Minsk Tractor Plant the proportion of retired fixed capital during the last five-year plan amounted to 5.7 percent, while in the present five-year plan it is anticipated to be only 3.6 percent. But it was at this very enterprise that in 1975 almost half the metal-cutting machinery and more than 63 percent of the forging and pressing machinery were already more than 15 years old. At the Minsk Motor Plant the indicator of retired fixed capital is at the 2-percent level. Here the following growth has been observed in the proportion of equipment which is more than 15 years old: from 16.1 to 23.9 percent of the metal-cutting machinery and from 9 to 27.3 percent of the forging and pressing machinery. A similar situation also exists at many other machine-building enterprises. As calculations have shown, during the years 1976--1980 approximately 9 percent of the fixed capital was replaced, but in enterprises of the machine-tool industry, as well as tractor and agricultural machine building the respective figures are only 6 and 4 percent. The reduction in the rates of retirement of fixed capital during the current five-year plan is a result of the fact that funds are being allocated primarily not for replacing worn-out fixed capital but rather to expand production. New capacities have been introduced, for example, for turning out trucks, tractors, fodder-harvesting combines, and other machinery for livestock-raising and fodder production, along with metal-cutting machine tools, electric motors, various instruments, and electronic items.

Let us note that the comparatively high percentage of renewing the fixed production capital with an insignificant removal of older components leads to a heterogeneous mix in the existing stock of equipment with regard to age, technical level, and degree of wear. It is precisely this which in a number of cases is the cause of the lack of coordination between the capacities of various sections of an enterprise, especially in the main and auxiliary production lines.

The economic efficiency of machine-building production is also considerably influenced by the structure of the stock of metalworking equipment and, above all, by the ratio between the metal-cutting machine tools and the forging and pressing machinery. An increase in production efficiency requires a more widespread utilization of the latter. According to estimates by specialists, as a result of replacing cutting by forging and stamping labor outlays are reduced by an average of 20 percent, savings in metal amount to 15--25 percent, those in production areas --by about 30 percent, and the total time required to manufacture a part is reduced by an equal amount on the average.

The most effective ratio between the stock of forging and pressing machines (KPM) and metal-cutting machine tools (MS) is 1:3, i.e., for every 100 MS there should be 30--35 KPM. However, as calculations have shown, this ratio is not being maintained. Thus, the proportion of forging and pressing machines in the total stock of KPM and MS during 1975 amounted to approximately 15 percent. By the end of the current five-year plan it has risen by only 1.6--1.7 points (for every 100 MS there are about 20 KPM).

The structure of the stock of equipment in the BSSR's machine building is formed, for the most part, under the influence of the enterprises of the motor-vehicle, bearing, machine-tool and instrument industries, as well as tractor and agricultural machine building, where 67 percent of the metal-cutting machine tools and 48 percent of the forging and pressing machines are concentrated out of the corresponding stocks of this equipment at machine-building enterprises of All-Union status. At the enterprises under the Ministry of Tractor and Agricultural Machine Building the proportion of KPM is considerably lower than the average for this sector, and for a number of years it has remained at the same level--9--10 percent, while at the Minsk Motor Plant and at the Borisovo Assembly Plant a reduction in this indicator was even noted from 5 and 3.9 percent respectively in 1975 to 4.8 and 2.2 percent in 1980. Matters are even worse at enterprises of the machine-tool and instrument-building industry, where for every 100 MS there are only 6--7 KPM. Somewhat low indicators (12--13 KPM per 100 MS) also exist at enterprises of the motor-vehicle industry, although at certain of them (the Minsk Motor-Bike Plant, the GPZ-11, the Osipovich Automotive Parts Plant) this figure falls within the limits of 16--26 units.

Thus, the solution to the problem of altering the ratio between processing by cutting and by pressure requires not only a quantitative growth in the stock of KPM but also a considerable improvement in machine-building production, based on more thorough specialization, further development of the technological processes of metalworking, as well as an increase in the assortment of rolled metal with precise dimensions, bent and pointed rolls, extended and pressed shapes, etc. Moreover, the increase in the production of KPM must be accomplished on the basis of the trends of scientific and technical progress in both machine building as well as in the metallurgical industry. Otherwise, the increase of such equipment will

be unjustified from an economic point of view. Let us also note that an increase in production efficiency is ensured not only by an increase in the proportion of forging and pressing machines in the stock of metalworking equipment but also by the rational combination of technological groups of machine tools and machines. The optimum proportions of their use determine the qualitative level of the technical base of machine building and dictate the principal directions of scientific and technical progress in the entire sector. Thus, a high proportion of lathes and boring and turning lathes at a given enterprise testifies to the fact that the progressive methods for producing semi-finished items (castings or stampings) are not important here, and, as a result, there is a significant percentage of crude processing.

And there is yet another problem. During the last few years there has been a rapid growth in the stock of machine tools with numerically programmed controls (ChPU). If we compare the productivity of one such machine tool with an ordinary one at a ratio of 2.5:1, then 200,000 such machine tools with ChPU working in two shifts replace about 700,000 ordinary ones. Inasmuch as the majority of machine tools with ChPU must be serviced in principle by "one worker to two machine tools," then to service 200,000 machine tools with ChPU in two shifts requires only about 250,000 machine-tool operators instead of the 1 million necessary to operate 700,000 ordinary machine tools during one and a half shifts. This will provide us with the relative opportunity to free up about 0.5 million machine tools and 750,000 machine-tool operators.

Positive qualitative changes have also been noted in the structure of the stock of forging and stamping machinery. There has been a growth, for example, in the proportion of forging and pressing automatic units and forging machines. At the same time there has been a reduction in the proportion of hammers and pneumatic presses. However, over the course of a lengthy number of years at our republic's machine-building enterprises a large proportion of mechanical presses (40--50 percent) is still maintained at the republic's machine-building enterprises. But the proportion of forging and pressing automatic and semi-automatic units varies between 11 and 13 percent. And, of course, the technological structure of this or that equipment determines the level and nature of the technology. The structure of the stock of metalworking equipment, for example, has a substantial influence on the indicators of return on investment, labor productivity, and production costs.

Of course, improvement in the structure of producing machine tools and improving their quality in the future will be carried out at speeded up rates, which is mentioned in the decree of the CPSU Central Committee and the USSR Council of Ministers, "On the Significant Rise in the Technical Level and Competitive Capability of Metalworking, Casting, and Woodworking Equipment and Instruments." This decree is also directed at sharply raising during the course of the 11th Five-Year Plan the technical level and productivity of the machine tools, forging and pressing, and casting machine being manufactured, and, on this basis, to introduce into machine building progressive technology and highly efficient methods of production organization. The Ministry of the Machine-Tool Building Industry has been assigned the task of sharply increasing the production of the most advanced types of equipment, in particular, by means of reducing the production of outmoded types of machine tools and machines. Particular attention will also be paid to the introduction of assembly, mechanized-assembly, and automated lines, which has already permitted us to organize quite a few comprehensively mechanized and automated sections and shops.

Despite this, however, the level of labor mechanization and automation is rising extremely slowly. Thus, over the four years of the current five-year plan it has increased by only 1.8 points and last year amounted to 53.2 percent. The proportion of auxiliary workers has remained extremely high. In the republic's machine building it is approximately 40 percent, and in the automotive industry, tractor and agricultural machine building it is more than 50 percent.

Assembly operations have also been poorly mechanized. The labor consumption of preliminary and over-all assembly, set-up and adjustment, for example, in machine building comprises 37--38 percent, while in single-type and small-series production lines the amounts are 50--60 percent. The production costs of assembly operations comprise 50 and more percent of the costs of manufacturing items, and this is caused by a predominance of manual labor.

An increase in the efficiency of machine-building production, based on its intensification and speeding up its technical development requires a decisive elimination of the gap which has formed between the mechanization and automation of the basic and auxiliary processes. If the technical improvement of the basic sections will in the future proceed along the path of renewing the stock of existing equipment, replacing older units with more productive equipment which operates within automatic and semi-automatic systems (and this will be precisely the case), then in the auxiliary sections the principal attention must still be concentrated on the quantitative processes of mechanization and the mass conversion of workers from manual labor to mechanized and automated labor. But, of course, the solution of these problems must be interrelated and interdependent, for only with a comprehensive approach is it possible to have a result-producing solution to the problem of the complete mechanization and automation of machine-building production.

Thus, analysis and evaluation of the technical level of production in the republic's machine-building enterprises has shown that there are here considerable reserves for raising labor productivity, improving the use of fixed production capital, and raising the level of mechanization and automation of production.

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METALWORKING EQUIPMENT

SECOND KAMA FORGE GOES INTO OPERATION

Moscow STROITEL'NAYA GAZETA in Russian 7 Jan 81 p 2

[Article by A. Shekhirev and K. Seglin: "Forges without Hammers"]

[Text/ Five years ago the January issues of STROITEL'NAYA GAZETA published reports from the forging plant of the KamaZ (the Kama Automotive Plant) on the putting of its buildings into operation. And today we are again presenting a story about the KamaZ forge. On the eve of the New Year a state commission accepted its last production building for operation. The days of January 1981 have been the first days in its working biography.

The production of motor vehicles has begun from the forge. On the eve of the 25th Party Congress the first section of the Kama Automotive Complex was ready to be turned over for operation, and the forge was among its first facilities to start up.

Now, on the threshold of the 26th Party Congress, construction is nearing completion on the second section of the complex. And again one of the first components to be put into operation is the new forge building. It is the largest in the KamaZ forge with a fully developed area of 70,000 square meters. With its start-up the plant's rated capacity increased by a factor of 1.5, and it has now become the largest enterprise of its kind in the world.

The very name "forge" is reminiscent of an anvil, like a picture of a smith in his worker's garb and leather apron, standing with his hammer at an anvil. But here even the largest parts are not really forged but stamped; the semi-finished blanks are heated up by means of high-frequency currents. The two machine rooms of the building resemble the machine rooms of an electric power station: installed within them are 17 generators producing 2,500 kilowatts each.

Let's go into the shop where the automated lines are located. Each of them constitutes a chain of presses and units with various "specializations"; they heat up the semi-finished blank, process it, and turn it into the assigned part. And they themselves monitor the quality of manufacture. They are all connected by conveyors to which after the regularly scheduled operation the part is delivered by mechanical arms. The operators merely observe the course of the technical process.

"This equipment was installed by the brigades of the veterans of building the KamaZ, G. Zuykov and V. Osipenko. They mastered well the assembly-line-disjointed method of installation within which each unit is specialized in certain limited operations, and they reduced the normative time periods by a factor of 1.5." So

we were told by V. Gyl'basarov, Chief of the Chelninsk Installation Administration of Trust No. 7. "Setting up the 110-ton base for the presses was particularly complicated. The fact of the matter was that the total load-hoisting capacity of the two cranes which we had at our disposal was only 70 tons. Then our innovators made a special crossarm with which they equipped the cranes, and in this manner we installed the press bases. The results of the labor of the installation workers is what is called okay."

And in order to see where a brigade was working under the leadership of another veteran of the construction project--the Communist N. Sinyavskiy from the SMU-1 general contractor of the Automotive Plant--it was necessary to climb down into the oil pit. Its footings under the columns, like those of both machine rooms, were built by the brigade on the basis of a subcontracting agreement and reduced the time periods by 50 days. Already in 1976 this brigade had won the title of best in the ministry, and here also the banner of labor glory was raised in its honor on more than one occasion.

The smiths of KamAZ have taken the baton of the shockwork of the pre-Congress labor watch from the hands of the builders and installation workers.

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METALWORKING EQUIPMENT

PRODUCTION, DEVELOPMENT OF INDUSTRIAL ROBOTS STRESSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 51, Dec 80 p 10

[Article by Yu. Kozhev, scientific director on the Problem of "Industrial Robots" of the Ministry of the Machine Tool and Tool Building Industry, candidate of technical sciences: "The Important Role of Industrial Robots"]

[Text] "On the basis of utilizing the achievements of science and technology to develop production and guarantee the widespread adoption of automatic manipulators (industrial robots),"--so states the plan of the Basic Directions.

By the end of the 10th Five-Year Plan, according to preliminary data, the total output of automatic manipulators in our country has exceeded 6,000 units, which is more than the plan assignment. However, the need for them is considerably greater. According to calculations by the ministries, during the course of the period 1981--1985 it will amount to approximately 100,000 units. Of this amount as much as 80 percent of the manipulators are earmarked for machine building and metalworking enterprises.

The top-priority introduction of industrial robots as means of automating the production processes in machine building is justified according to principle. In comparison with other sectors it is the most saturated with machinery, has the most highly skilled personnel, and the latter possess experience in automation.

Nevertheless, even in machine building industrial robots have been introduced at a slow rate up to the present time. The existing possibilities of Soviet technology and machine building for increasing the output of such equipment have not been fully utilized.

At present a comprehensive program of scientific research and design projects is now being worked out for creating and developing automatic manipulators for the years 1981--1990.

In the sectors of machine building we need to carry out a complex of measures with regard to preparing production for the use of robots (redeveloping technological processes, replanning production areas, organizing specialized operational and repair services, etc.). We cannot avoid modernizing serially produced equipment for ensuring its operation in conjunction with robots.

A shortage is still felt in the area of reliable complete sets of manipulators, especially small-sized, high-energy electric drives. There are still urgent

problems in creating improved control systems and data-systems sensors, on which we depend primarily for the trouble-free operation of the robots and the flexibility of their "behavior," as expressed in their ability to carry out the most diverse actions.

Fulfillment of the tasks set forth in the plan of the Basic Directions depends on the joint coordinated actions of a number of machine-building ministries. It is a matter of organizing the centralized production of automatic manipulators, providing a full assortment of items, as well as auxiliary apparatus.

Many technological processes in various sectors of machine building are analogous in their nature. Here we can find application for the operation of a single type of robot. Hence /it is feasible to concentrate their production in machine-tool building/ **/In boldface/**--the sector which supplies machine building with technical equipment.

In the plan for developing machine-tool building in the 11th Five-Year Plan we must provide for the allocation of the necessary production capacities. A proposal has been set forth /to organize within the Ministry of the Machine Tool and Tool Building Industry a specialized scientific research and plan designing subdivision/ **/In boldface/** (for example, SKB "Robot"). It would be called upon to engage in providing the builders of specialized plants with engineering specifications, to sum up the experience of planning and design as well as technical operations in the field of robot technology for the purpose of working out a unified, All-Union standard type of automatic manipulators. This would exclude any unjustified duplication of developments.

Finally, this country still lacks a specialized organization for servicing industrial robots at the consumers' places of business. Such an organization is extremely necessary. It could be created under the aegis of the Ministry of the Machine Tool and Tool Building Industry; moreover, it could be done within a brief period of time.

More than 160 models of automatic manipulators have now been created in this country. The best of them are beginning to be produced on a serial basis.

All the prerequisites are in place so that during the 11th Five-Year Plan we may step up production and introduction of industrial robots in the necessary quantities.

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METALWORKING EQUIPMENT

VOICE-CONTROLLED ROBOT DEVELOPMENT STATUS DISCUSSED

Moscow IZVESTIYA in Russian 26 Nov 80 p 3

[Article by S. Tsikora, special IZVESTIYA correspondent, Kiev: "A Robot Hears the Command; Researchers Study Controlling Automata by Means of a Voice"]

[Text] The rooms of all computing centers are like one another: the white coats of the coworkers, the air conditioners, the metal-protected computer cabinets, the chorus line of light signals on the control consoles of computers, the infinite paper tapes with digital solutions to problems. This usual picture is disrupted when the next hour the large computer is put into the hands of experimenters. Thus I became a witness to a highly unusual lesson: The computer was learning to understand human speech.

The "lesson" was given in the computer room of the Ukrainian SSR Academy of Sciences Institute of Cybernetics Computing Center, where I was invited by a leading specialist in this area, Taras Klimovich Vintsyuk. We went up to one of the computers, beside which was a stand with a microphone.

"Today our computer is already able to recognize 1000 words," said Vintsyuk. "This vocabulary is sufficient in order to control by voice very complicated production processes, for example. But this is in the future and the important thing for us now is the error-free understanding by the computer of words pronounced by a human being."

The microphone was turned on and one of the laboratory's associates sat behind a table and, enunciating the words clearly, pronounced:

"Tochka, tochka, zapyataya [dot, dot, comma]."

Everyone turned to the light panel. In a second on the computer's screen, as on the tape of a newsreel, ran the words "odin, odin, pyat' [one, one, five]."

The machine clearly did not understand what was said. Apparently no one expected such a surprise from it. There was an awkward pause.

The experiment had to be stopped. When the reason for the incorrect answers was explained, everyone broke out laughing. It seems that the operator, seeing T. Vintsyuk with a guest, decided that Taras Klimovich would "converse" with the

computer and inserted the program tuned to his voice and pronunciation. The machine, having "heard" the voice of another person, refused to understand the words of the stranger and began to send to the screen everything which arrived in its "electronic head."

The error was corrected and after this the computer did not clown around: It wrote correctly on the lit screen all the words spoken into the microphone. The experiment was gradually made more complex. It began, as I have already said, with the pronunciation of individual words and ended with logically connected phrases. The machine wrote them without errors; from everything it was obvious that it knew the basic rules of grammar.

But the "malfunction" which occurred at the beginning of the experiment all the same influenced the turn of my conversation with T.K. Vintsyuk. Anticipating questions, he himself began to speak about both the strong and weak sides of the system demonstrated.

"To write words and connected speech grammatically correctly from dictation, to recognize by voice who is speaking--an acquaintance or a stranger--is a serious achievement for a manmade system, even by the very high standards of modern science. But this is only the first stage of that intended. When the computer refused to print 'tochka, tochka, zapyataya' from a strange voice, this showed its weak side. Of course 'tochka, tochka, zapyataya' is an exercise for checking grammatical correctness, and not the computer's vigilance. And, it would seem, it was not able to understand this perfectly simple situation."

"A system for the recognition of speech has been in operation at the Institute of Cybernetics for more than 10 years. First they taught it to recognize simple commands. These were the most often used words or word combinations of some narrowly specialized field of human activity. To go rapidly to the next step of problem solving--to the comprehension by the computer of whole sentences--was made possible by a solid undertaking of theoretical developments and the existence of large fast computers. We want to teach the machine to understand words and connected sentences. This is a very important qualitative leap in solving problems of recognizing and synthesizing sound forms."

"We think that the preparatory step of the job of creating a system with traits of intellectual activity has been practically concluded," said Taras Klimovich. "All the components of a program for such an unusual problem have already been prepared. To our great sorrow this program does not imitate the operating principles of the human brain. Physiology can still not report to cyberneticists anything concrete regarding these questions. It is necessary to compensate the knowledge gap by increasing the speed of computers and their ability to sort in their 'brain' an enormous number of variants."

"According to our estimates real flashes of 'artificial intelligence' will appear with a speed of 100 million operations per second in the changeover to a single-processor computer. Such high-speed computers have already been created. Their key components have been developed in laboratories. But in order not to lose time we are trying to reach our goal by using not too large a vocabulary--1000 to 2000 words--and special-purpose computers."

What ideas do scientists, having such helpers, intend to implement?

A.A. Stogniy, Ukrainian SSR Academy of Sciences corresponding member and deputy director of the Ukrainian SSR Academy of Sciences Institute of Cybernetics says:

"The creation of artificial intelligence is not an idle pursuit of scientists to satisfy their curiosity. The general line of our technical development--the utilization of new technology and the automation of its processes--requires from science ever more perfected control equipment. The time is coming when narrowly specialized equipment--machine tools with program control, automated lines and even robot manipulators--will exhaust the potential of our capabilities."

"The next step is automatic equipment which operates not from pressing a button, but from understanding a command spoken by a human being and which is able to correct its work from the oral instruction of a specialist. An essentially new generation of robots is being created now. It to a considerable degree will alter the very content of work in machine building, power engineering, oil drilling, and in the electronics and other branches of industry."

"When will this be completed? Raw data are required for any forecast, but for the time being we have only one figure: About 10 years were necessary from the specific dream of scientists to teach a computer to understand human speech to the fulfillment of this dream in the laboratory."

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METALWORKING EQUIPMENT

ROBOT PRODUCTION WOES IN VORONEZH REPORTED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Nov 80 p 2

[Article by V. Kaverin, chief engineer, Voronezh Production Association for the Production of Drop Forging Equipment imeni M.I. Kalinin: "A Robot, from Design to Shop; Sphere of Common Effort"]

[Text] The Voronezh Production Association for the Production of Drop Forging Equipment imeni M.I. Kalinin is one of the first in the industry to begin to produce industrial robots. It was necessary to begin from scratch, as they say, and we immediately encountered difficulties. The first few times parts for manipulators were made in all shops and there was not even a special section for assembly. And only with the entry into service of a new building at the main plant was it possible to set up a section of this sort. Production process engineers developed designs of special benches for testing units and for debugging the control console of a manipulator.

It must be said that the production of robots has specific features. The mechanical "arms," the mechanisms for turning and lifting and the control system with logic elements require the special attention of specialists and workers. Here both the manufacturing technology and the skills of the performers have very high requirements. In addition, the know-how gained by the main plant's team in the manufacture of drop forging machinery was not always able to be useful in the production of parts and assemblies for manipulators. This is why it was necessary to retrain not only workers, but also engineering and technical personnel. The need to create new services also arose. For example, in the chief production process engineer's department a technological bureau was set up, which was headed by Experimentation Specialist V. Sinetskiy. It began to work on the technology of fabricating robot parts. Another special bureau appeared in the chief design engineer's department. Its job was to design manipulators and to improve them. We also created special-purpose production processes for fabricating pneumatic cylinders with an adjustable stroke, pivoted motors, hydraulic shock absorbers and control systems.

Now we produce more than 100 manipulators which work as part of automated complexes. The range of their application is very broad. At the Voronezh Elektrosignal Plant four complexes have completely replaced manual labor in manufacturing the chassis of the "Rekord" television set. At the Melitopol' Motor Plant a robot is used in forging heads for automobile engines. At the Dnepropetrovsk Southern Machine

Building Plant five complexes are forging parts for the "Belarus'" tractor. As a result the work of many workers has been made easier and some of them have been freed and transferred to other operations.

At the beginning of the present year we produced an experimental model of a complex for performing certain cold forging processes. This is the first time in the country it has been created. Its use makes it possible to increase the labor productivity of workers three- to fourfold. Before the end of the year automated complexes with a similar purpose will be manufactured, but on the basis of presses with a force of 250 and 315 tons. And designs of new machines with robots taking part have been undertaken by the association's design engineers.

The CPSU Central Committee's decree "On Measures for Increasing the Production and Extensive Use of Automatic Manipulators in Industries of the National Economy in Light of the Instructions of the 26th CPSU Congress" has provided new impetus for our research. Now our major task is to increase twofold as compared with 1980 the output of robots by the end of the coming five-year plan period. And here it is necessary for us to solve a number of serious problems. Internal problems do not especially bother us: Certain experience has already been gained, personnel have been trained and major trends have been determined. With the external problems it is much more complicated. I will dwell on these in more detail.

The design of the industrial robot which we produce was developed by the Voronezh ENIKmash [Experimental Scientific Research Institute of Press and Forging Machine Building]. The design is rather original. The most important unit--the robot's pneumatic cylinder "arm"--was produced successfully. But here is the situation. The Khar'kov VNIlgidropriwod [All-Union Scientific Research Institute of Hydraulic Drives] is working on a similar development, in close contact with the Ordzhonikidze Experimental Pneumatic Equipment Plant. We have been obliged to receive these items from it. Unfortunately the pneumatic cylinders created in Ordzhonikidze have proved to be unsuitable. As a result it was necessary to set their manufacture right at the main plant of our own association. It is not difficult to understand what it cost to restructure production within a short period and to bring the unit "up to snuff," as they say. And in fact more simple than this is for representatives of the two institutes, manufacturing enterprises and users to gather together and settle on a specific design and then to begin producing it at a special-purpose plant.

Matters are even worse with robot control consoles. In developing the design ENIKmash did not determine the manufacturing plant, and it should be an enterprise of Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems]. Again there are feverish searches, again all kinds of disorganization and losses of time. The lack of coordination has become even now an impediment to the development of the production of advanced equipment, but what will happen in the future when problems become more complicated? In fact in the 11th Five-Year Plan period we will begin to produce improved robots and readjustable automatic lines based on them. Here interruption and inefficiency are impermissible. Consequently, already now both Minstankoprom [Ministry of the Machine Tool Building Industry] and the USSR State Committee for Science and Technology and design institutes should see to the centralized manufacture of components and must designate a clear system of specialization and cooperation.

It is impossible not to be disturbed by something else. A priority is complexes with ChPU (numerical program control). This, if you will, represents our industry's tomorrow. But it is also the tomorrow of the state of equipment of users. And they already now must be prepared to use improved equipment. Practice has shown that not infrequently new equipment unexpectedly crams them. At the Minsk Motor Vehicle Plant, for example, automated complexes with robots have collected dust in the warehouse for two years. Other similar examples can also be cited. The reasons, as a rule, are the same--a production technology has not been worked out, the place of automation in the overall process has not been defined, and qualified personnel have not been trained. Consequently, enterprises should base their orders on the delivery of complexes, both economically and technologically. Only then will robots yield the planned return and perform to the full extent the functions entrusted to them. Only upon this condition is it possible realistically to count on freeing people from difficult and labor intensive operations.

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METALWORKING EQUIPMENT

CHANGEOVER FROM STEEL TO PLASTIC PIPES UNDER WAY; TRANSITION PROBLEMS NOTED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Nov 80 p 2

[Article by V. Romeyko, USSR Gosplan subdivision chief: "Plastic Instead of Steel"]

[Text] Our country ranks first in the world in the total production of steel pipes. The successes of metallurgists have created a reliable basis for solving highly complicated national economic problems associated with the transport of oil and gas and several chemical products over large distances and with the development of machine building, nuclear power and many other industries. The percentage of pipes, of the total weight of rolled ferrous metals, has been growing steadily. But are the products of tube-rolling plants always used intelligently? Far from always, it seems. For example, laying steel pipes in water supply systems and sewer system does not work out regarding the life of the pipes. The high strength of steel and its ability to withstand high pressures are not utilized completely here and corrosion consumes the metal so quickly that almost as many pipes are required for the repair of existing routes as are needed for laying new ones.

According to estimates, by replacing metal with plastic we can save approximately a million tons of steel pipes. This is tantamount to putting a large enterprise into service!

More and more frequently pipes made of thermoplastics have been replacing their metal sisters in low-pressure systems. Understandably this requires serious changes in the technology of constructing and utilizing pipelines. A plastic pipe today is several times more expensive than a steel one. The planned price review will reduce this difference, but not eliminate it. And this means that the saving from replacing steel with plastic will be higher the longer a pipe made of the new material lasts. Metal in water pipes, as experience has proven long ago, rarely lasts the proposed 20 years. Dozens and even hundreds of examples can be cited when individual sections of routes had to be replaced in the sixth or seventh year of use. But a thermoplastic--and this has been established with absolute certainty in laboratory "time machines"--is able to work without replacement for 50 years and more.

But plastic is a delicate material. In order for it to function long and reliably it is necessary to ensure high quality of the original product and of work at all stages, beginning with the manufacture of the parts of the system and ending with

their use. The fact is that the "punishment" for deviation from this rule comes quickly and with the inevitability of a physical law.

For example, at the beginning of the present five-year plan period at the Ekibastuz GRES a 34-km pressure header was assembled from polyethylene pipes. But after three years accident after accident suddenly occurred. The nature of the damage did not leave room for doubt: The reason was the low quality of the pipes, manufactured by the Vilnius Plastic Products Plant. At the Ladyzhin GRES plastic pipes went out of commission because of poor-quality packaging and the violation of transport rules. Deviation from the technology for welding polyethylene during installation entailed the premature major overhaul of several municipal gas mains.

But we will not force a fear of plastics. There are considerably more positive examples. Every year in the country's hydropathic establishments are installed approximately 60 km of plastic pipes for very different purposes. Glavmosstroy [Main Administration for Housing and Civil Engineering Construction in Moscow] has arranged for the assembly-line production of bathroom stalls equipped with sewerage systems made of plastic instead of the traditional cast iron. Since 1968 in Moscow the first 200 km of drains and sewage collectors made of plastic pipes have been functioning in good working order. The total length of these systems increases each year by approximately 250 km. And there has been not one failure from "natural" causes. A thorough investigation of the by no means not numerous cases of breaks has made it possible to draw a definite conclusion: The matter is not with the properties of the new material, but with unskillful handling of it.

It is not without reason that in the USSR Minenergo [Ministry of Power and Electrification] a special subdivision has been created which is totally responsible for designing and installing plastic pipelines, making equipment and tools, and training installation and servicing personnel. There is within the structure of Energoprompolimer [possible Association for the Use of Polymers in Power Engineering Industry] an experimental industrial production process for manufacturing and outfitting finished units and assembly bundles of plastic pipelines. All this has made it possible for power engineers to come to the forefront among industrial ministries with regard to the extent of the use of pipes made of promising materials. Valuable know-how, as already mentioned, has been gained in the USSR Ministry of Health and in Glavmosstroy.

However, with the increase in production of plastic pipes, the range of ministries and departments which will become future mass consumers of these products in the very near future will be broadened. As of 1 January 1981 the procedure for the shipment of pipes and parts of pipelines made of polyethylene and polyvinyl chloride has been established the same as for steel.

The concentration of capital for plastic pipes in the hands of builders is certainly a positive fact. But the personnel of subcontracting ministries and of planning agencies are worried today by the degree of readiness of manufacturers and consumers for the mass production and utilization of the new products. As early as in 1977 the USSR Gosplan created a special conference on these questions, in which representatives of 27 ministries and departments of the country participated. An extensive program of preparatory measures was designated. But it has been fulfilled slowly. In the spring of this year the Union Gosplan and Gosstroy were forced to send to ministries and departments of the country and to the councils of ministers

of Union republics a special letter in which was stressed the necessity of reviewing technical documentation for the construction and reconstruction of projects called for in work plans for the next few years, taking into account the replacement of steel pipes with plastic. It was also suggested to all customers that they see to the training of skilled personnel for using and repairing pipelines made of polymer materials.

Many ministries and departments have been conducting this training sufficiently actively. However, on the whole its pace, according to our information, is inadequate. Builders for the time being are ahead of their client partners.

Let us take the USSR Minpromstroy [Ministry of Industrial Construction]. Its technical administration has prepared a detailed program. Three main organizations have been established for the introduction of plastic pipes--Glavbashstroy, Glavpriokstroy and the Ryazan'stroy Association [expansions unknown]. Specific objectives and quotas have been assigned in 24 construction administrations and four republic ministries of industrial construction.

Whether this program actually becomes a total one depends to a very great degree on the numerous clients of the USSR Minpromstroy. They must guarantee timely preparation and present to builders technical documentation which will meet to the full extent the requirements of building standards and rules relating to reduction of the consumption of steel pipes and replacement of them with plastic and other non-metallic ones. They must also ensure the competent servicing of pipeline systems made of nontraditional materials.

To send this important problem out to drift is certainly not intelligent. If everyone keeps to himself, it is difficult to expect great successes. Therefore, as in any new task, in this there must be its "ringleader"--a head organization. This role, we think, is best suited to Minkhimprom's [Ministry of the Chemical Industry] "Plastik" [Plastic] Scientific Production Association. It is precisely within the framework of this association that it is possible at the lowest cost to create a cost-accounting startup and troubleshooting subdivision with constantly active courses for training specialists in welding and installing plastic pipelines. It is precisely here that there are all the conditions for setting up a testing center which would assume the functions of an industry OTK [department of technical control], evaluating the quality and durability of products.

At first such a measure will be adequate. But only at first. The increase in the extent of the production and use of polymer pipes in the next few years already requires a rather large contingent of specialists--engineers, technicians and workers. The Union Minvuz [Ministry of Higher and Secondary Specialized Education], Gosprofobr [State Administration for Vocational Education of the Population] and Goskomtrud [State Committee for Universal Labor Service] should see to their training beforehand. It also makes sense today for personnel of the USSR State Committee for Science and Technology to scrutinize a little more intently the complex of problems arising in connection with the birth of the new industry. All this must be done in order not to discredit an important task at the very beginning.

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